



AYRES

Vertical Accuracy Report

Wisconsin WROC - 3DEP 2020

Eau Claire County Lidar

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Vertical Accuracy Report

Project Information

Prepared By: Ayres

Project Name: Wisconsin WROC – 3DEP Eau Claire County Lidar 2020

Sensor Info: Riegl LMS-Q1560 SN 754

Required Nominal Pulse Spacing: 0.7 meters

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 Eau Claire 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 April 6 to April 13, 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, 47 NVA points and 33 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.

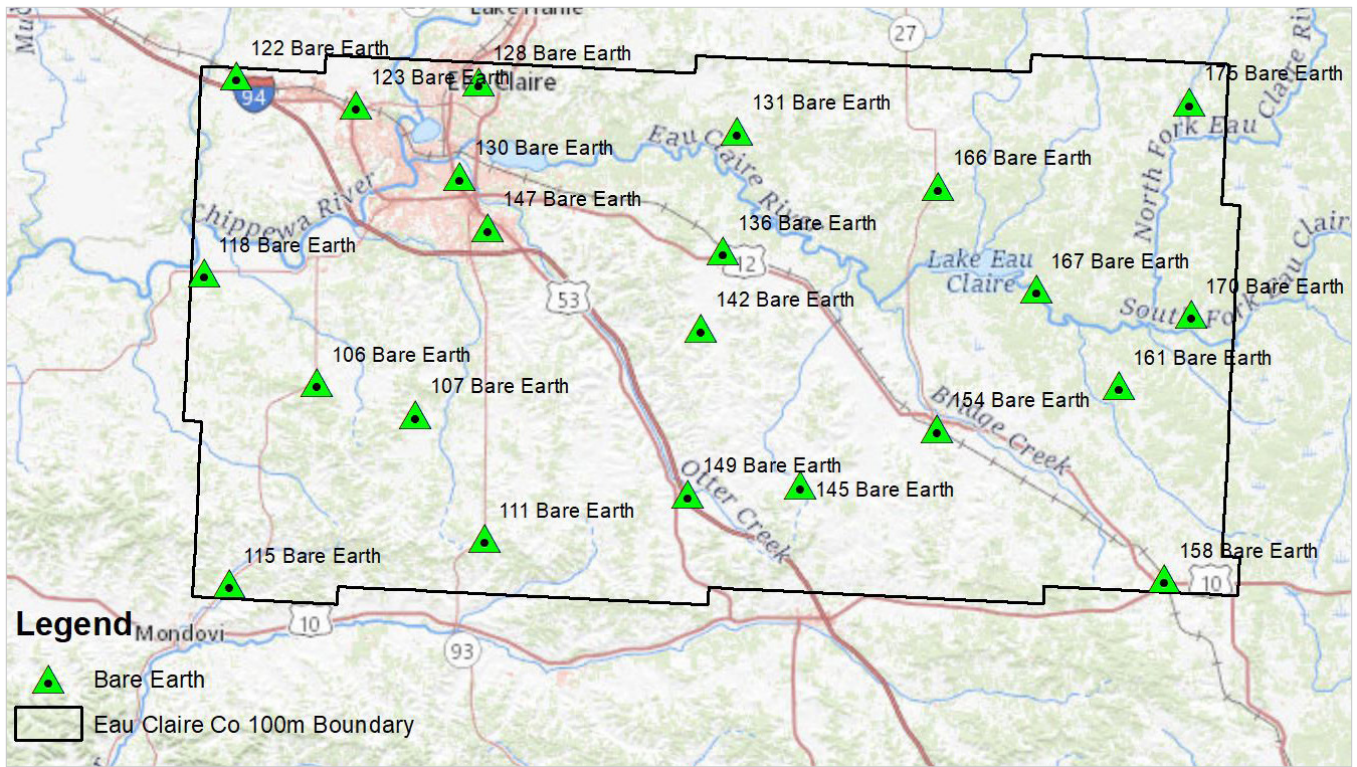
The NVA and VVA statistics for this project are within the above stated specifications.

Lidar Accuracy Assessment Summary

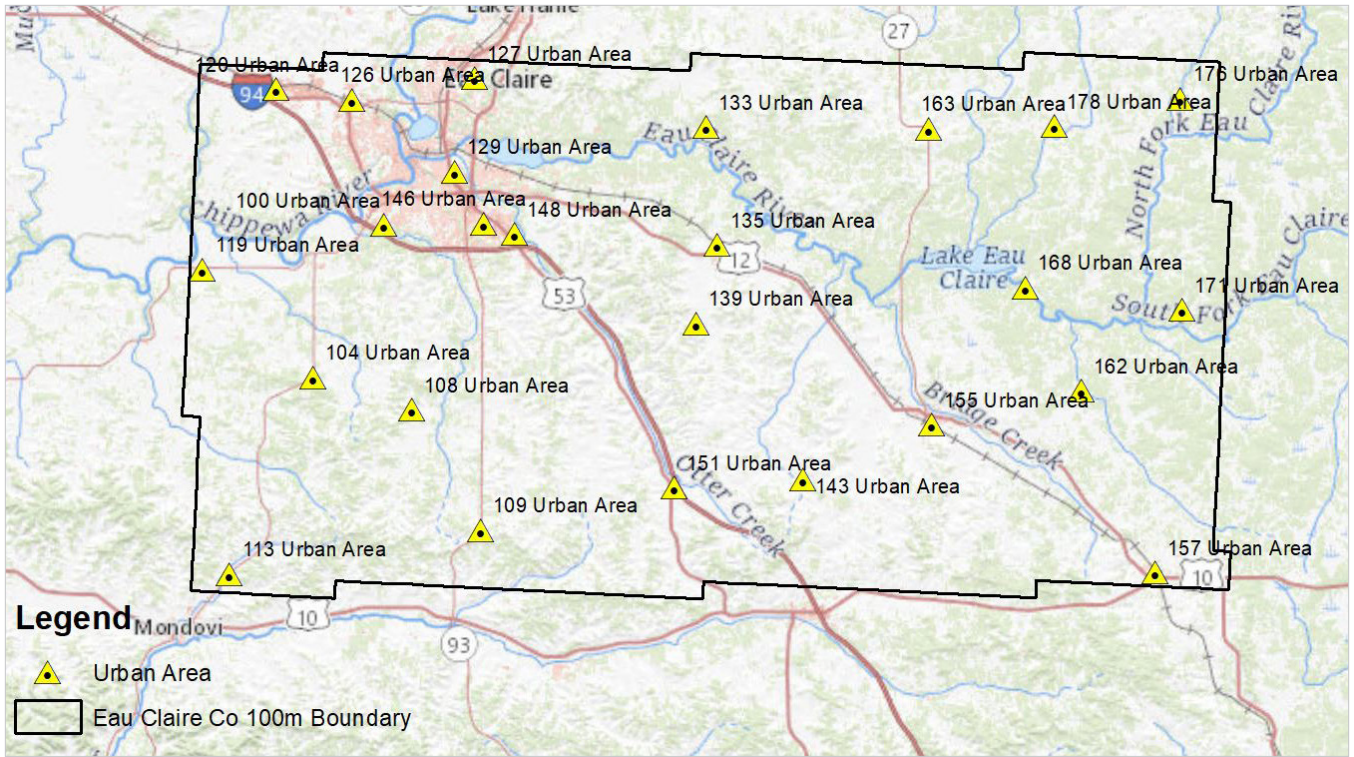
LAND COVER TYPE	# OF POINTS	NVA	VVA
LAS		95% confidence	
Bare Earth	22	0.193	N/A
Urban Area	25	0.175	N/A
Forest	15	N/A	N/A
Tall Weeds	18	N/A	N/A
Total	80	0.184	N/A
DEM		95% confidence	95th percentile
Bare Earth	22	0.211	N/A
Urban Area	25	0.211	N/A
Forest	15	N/A	0.266
Tall Weeds	18	N/A	0.302
Total	80	0.211	0.283

Units: U.S. Survey Feet

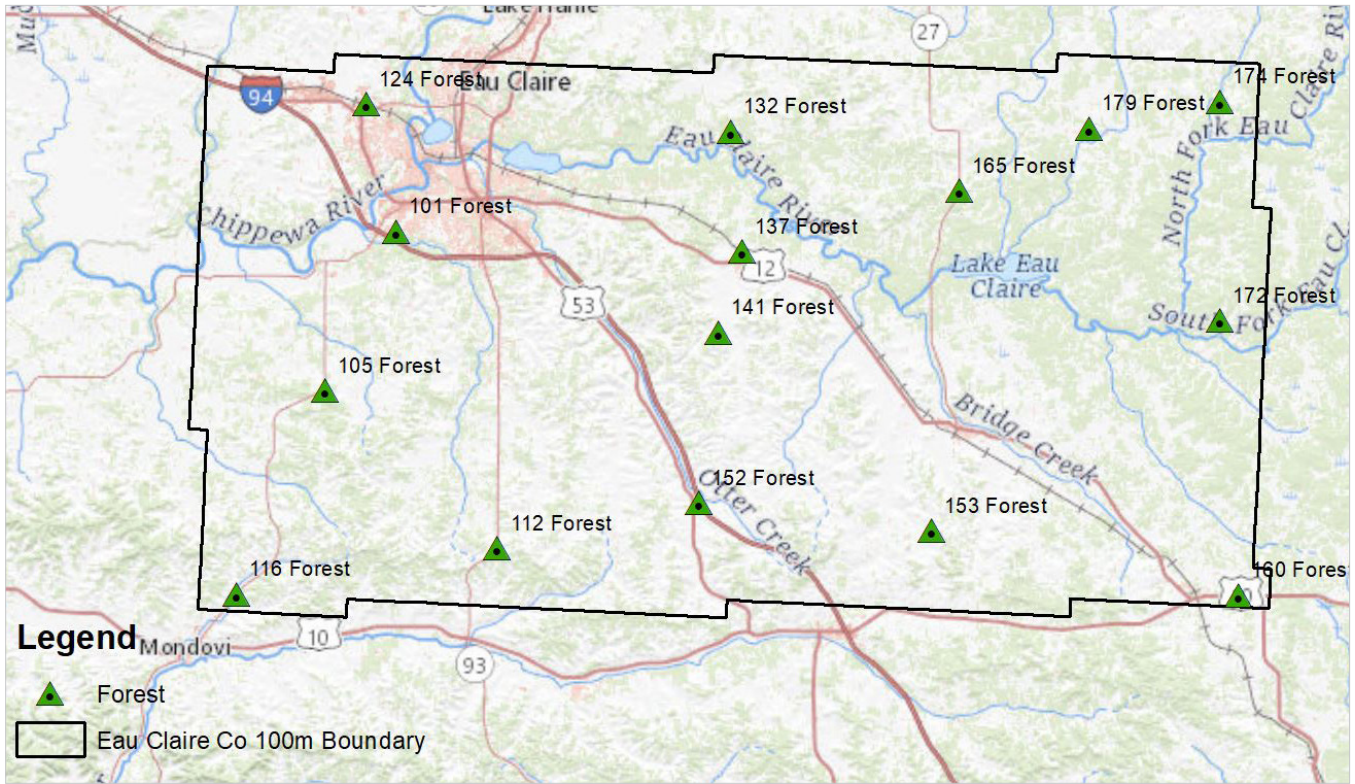
Map of NVA Checkpoint Locations - Bare Earth



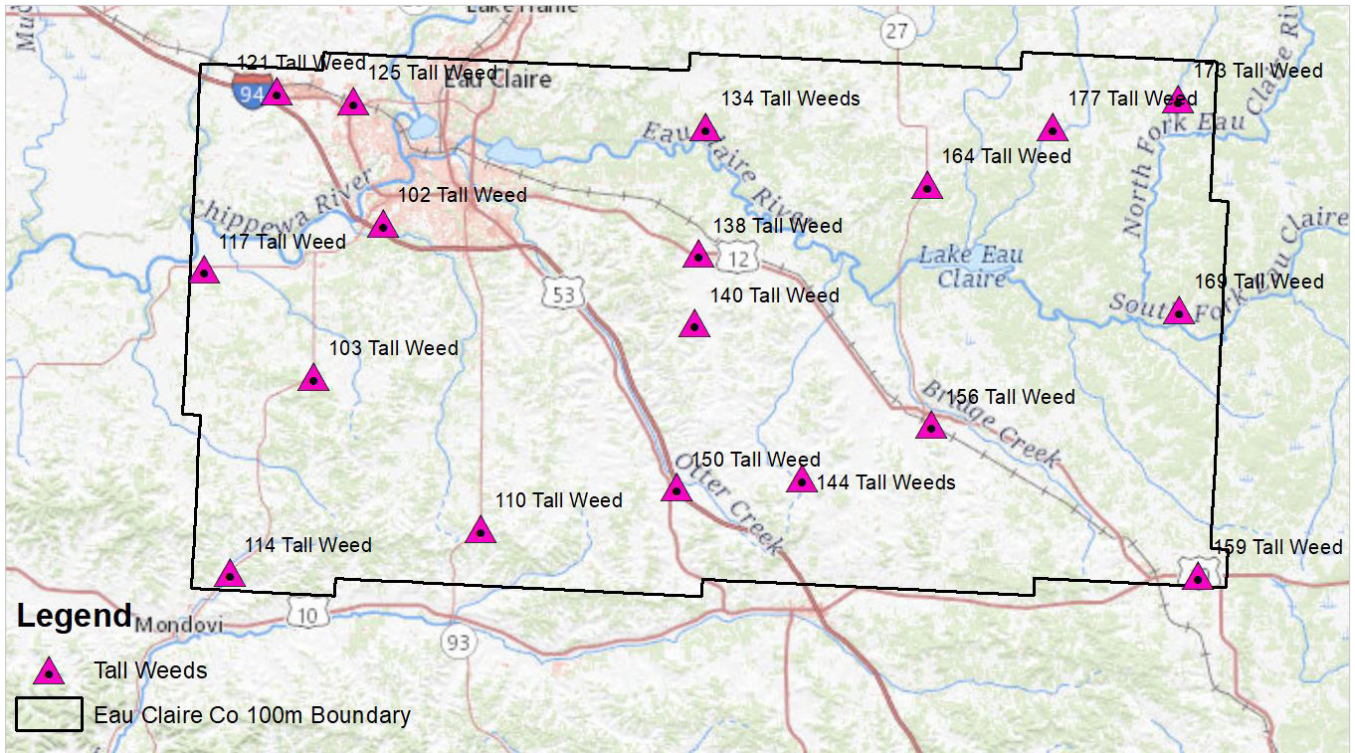
Map of NVA Checkpoint Locations - Urban Areas



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	-0.161
Maximum DZ	0.209
Mean DZ	0.034
Mean Magnitude DZ	0.28
Number Observations	47
Standard Deviation DZ	0.088
RMSE Z	0.094
95% Confidence Level Z	0.184
Units	U.S. Survey Feet

DEM

NONVEGETATED VERTICAL ACCURACY	
LAND COVER TYPE	BARE EARTH, URBAN AREA
Minimum DZ	-0.145
Maximum DZ	0.212
Mean DZ	0.064
Mean Magnitude DZ	0.309
Number Observations	47
Standard Deviation DZ	0.087
RMSE Z	0.108
95% Confidence Level Z	0.211
Units	U.S. Survey Feet

DEM (Continued)

VEGETATED VERTICAL ACCURACY	
LAND COVER TYPE	FOREST
Minimum DZ	0.065
Maximum DZ	0.277
Mean DZ	0.162
Mean Magnitude DZ	0.402
Number Observations	15
Standard Deviation DZ	0.078
RMSE Z	0.178
95th percentile	0.266
Units	U.S. Survey Feet

VEGETATED VERTICAL ACCURACY	
LAND COVER TYPE	TALL WEEDS
Minimum DZ	-0.088
Maximum DZ	0.334
Mean DZ	0.166
Mean Magnitude DZ	0.419
Number Observations	18
Standard Deviation DZ	0.106
RMSE Z	0.195
95th percentile	0.302
Units	U.S. Survey Feet

Point: 100 Urban Area

Survey X: 334294.85, Survey Y: 266622.58, Z1: 872.39, Z DEM: 872.38, Z LAS: 872.37, ΔZ DEM: -0.02, ΔZ LAS: -0.03



North



South



East



West

Point: 101 Forest

Survey X: 334157.34, Survey Y: 266738.65, Z1: 873, Z DEM: 873.07, Z LAS: 873.15, ΔZ DEM: 0.07, ΔZ LAS: 0.15



North



South



East



West

Point: 102 Tall Weeds

Survey X: 334073.72, Survey Y: 266850.13, Z1: 870.51, Z DEM: 870.59, Z LAS: 870.61, ΔZ DEM: 0.09, ΔZ LAS: 0.1



North



South



East



West

Point: 103 Tall Weeds

Survey X: 320997.78, Survey Y: 238051.71, Z1: 965.59, Z DEM: 965.61, Z LAS: 965.62, ΔZ DEM: 0.02, ΔZ LAS: 0.03



North



South



East



West

Point: 104 Urban Area

Survey X: 320937.66, Survey Y: 238021.97, Z1: 967.29, Z DEM: 967.35, Z LAS: 967.27, ΔZ DEM: 0.06, ΔZ LAS: -0.02



North



South



East



West

Point: 105 Forest

Survey X: 321182.29, Survey Y: 237775.53, Z1: 956.67, Z DEM: 956.73, Z LAS: 956.87, ΔZ DEM: 0.07, ΔZ LAS: 0.2



North



South



East



West

Point: 106 Bare Earth

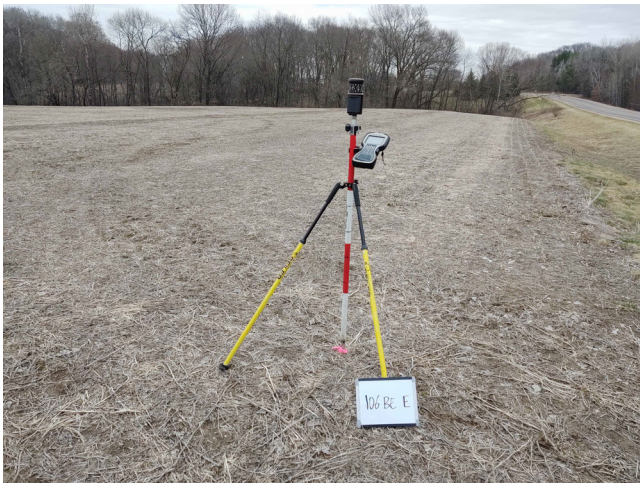
Survey X: 321205.1, Survey Y: 237905.36, Z1: 963.65, Z DEM: 963.69, Z LAS: 963.68, ΔZ DEM: 0.04, ΔZ LAS: 0.03



North



South



East



West

Point: 107 Bare Earth

Survey X: 339480.76, Survey Y: 232007.76, Z1: 955.15, Z DEM: 955.3, Z LAS: 955.27, ΔZ DEM: 0.15, ΔZ LAS: 0.12



North



South



East



West

Point: 108 Urban Area

Survey X: 339476.93, Survey Y: 231959.32, Z1: 955.79, Z DEM: 955.9, Z LAS: 955.9, ΔZ DEM: 0.12, ΔZ LAS: 0.12



North



South



East



West

Point: 109 Urban Area

Survey X: 352446.48, Survey Y: 209360.66, Z1: 1015.78, Z DEM: 1015.85, Z LAS: 1015.81, ΔZ DEM: 0.07, ΔZ LAS: 0.03



North



South



East



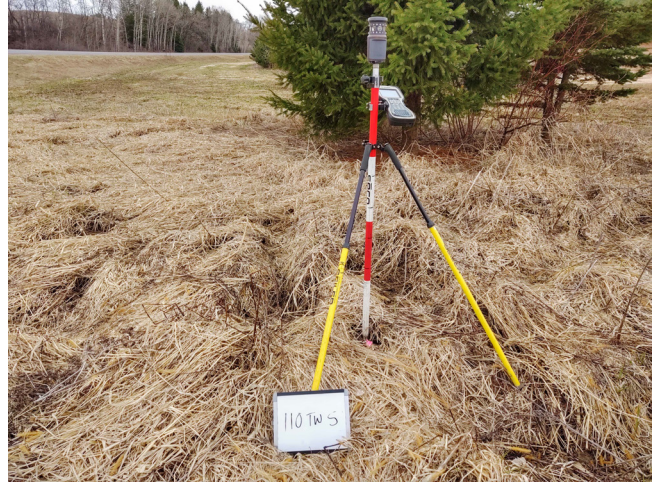
West

Point: 110 Tall Weeds

Survey X: 352395.28, Survey Y: 209313.4, Z1: 1012.52, Z DEM: 1012.75, Z LAS: 1012.84, ΔZ DEM: 0.23, ΔZ LAS: 0.32



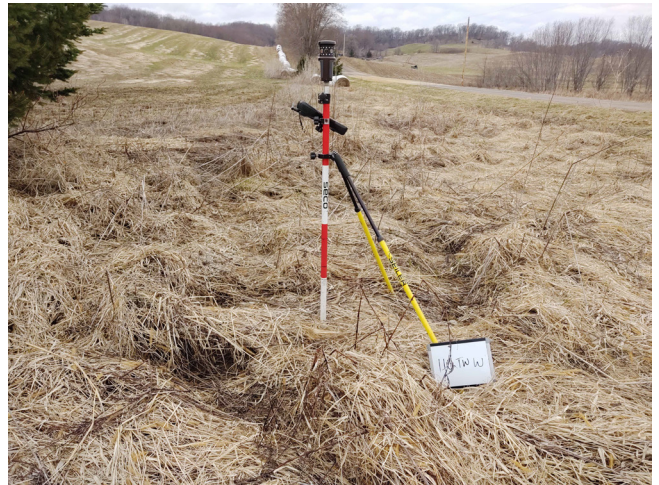
North



South



East



West

Point: 111 Bare Earth

Survey X: 352457.73, Survey Y: 208919.71, Z1: 1022.19, Z DEM: 1022.25, Z LAS: 1022.17, ΔZ DEM: 0.06, ΔZ LAS: -0.02



North



South



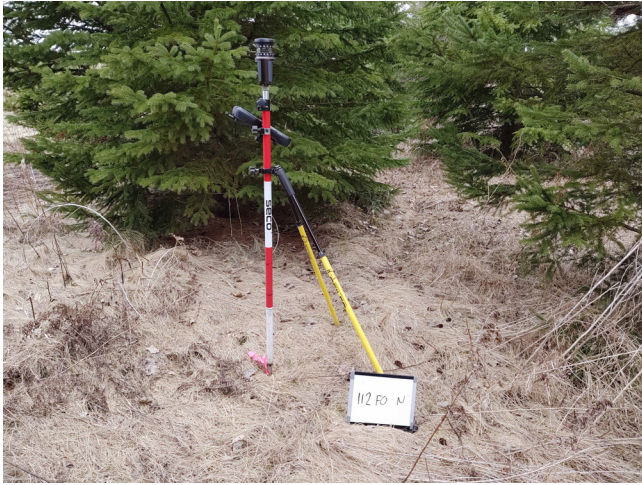
East



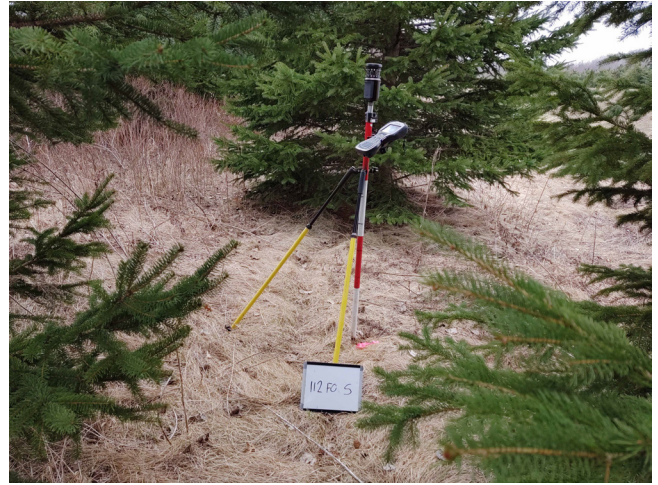
West

Point: 112 Forest

Survey X: 352509.7, Survey Y: 209086.75, Z1: 1014.69, Z DEM: 1014.91, Z LAS: 1014.86, ΔZ DEM: 0.23, ΔZ LAS: 0.17



North



South



East



West

Point: 113 Urban Area

Survey X: 305240.18, Survey Y: 201071.82, Z1: 855.79, Z DEM: 855.75, Z LAS: 855.76, ΔZ DEM: -0.04, ΔZ LAS: -0.03



North



South



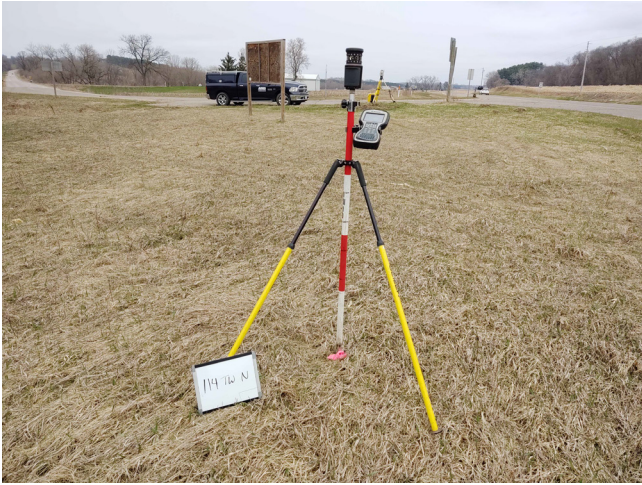
East



West

Point: 114 Tall Weeds

Survey X: 305154.12, Survey Y: 201000.33, Z1: 852.96, Z DEM: 853.1, Z LAS: 853, ΔZ DEM: 0.14, ΔZ LAS: 0.04



North



South



East



West

Point: 115 Bare Earth

Survey X: 304837.11, Survey Y: 200457.6, Z1: 853.12, Z DEM: 853.23, Z LAS: 853.21, ΔZ DEM: 0.11, ΔZ LAS: 0.08



North



South



East



West

Point: 116 Forest

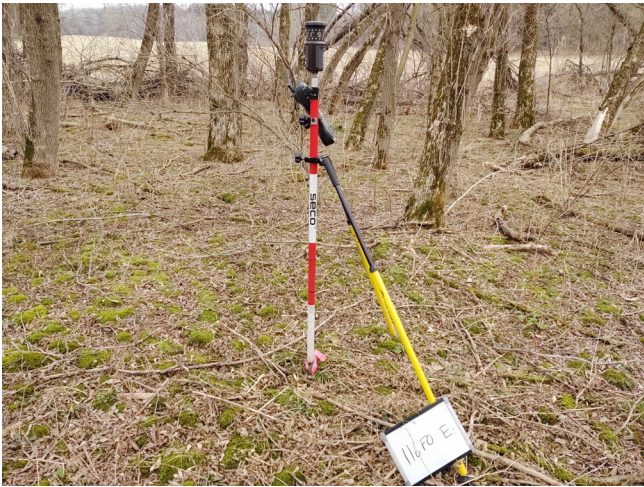
Survey X: 305077.4, Survey Y: 200692.17, Z1: 850.46, Z DEM: 850.59, Z LAS: 850.65, ΔZ DEM: 0.13, ΔZ LAS: 0.19



North



South



East



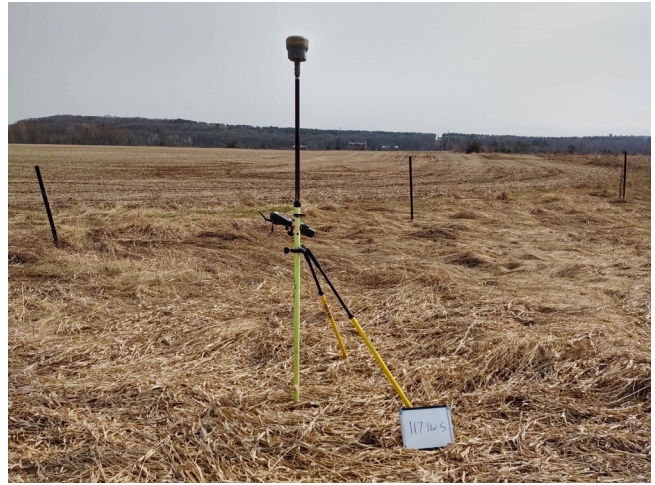
West

Point: 117 Tall Weeds

Survey X: 300262.21, Survey Y: 258194.88, Z1: 754.17, Z DEM: 754.47, Z LAS: 754.54, ΔZ DEM: 0.3, ΔZ LAS: 0.38



North



South



East



West

Point: 118 Bare Earth

Survey X: 300201.7, Survey Y: 258340.03, Z1: 754.6, Z DEM: 754.62, Z LAS: 754.56, ΔZ DEM: 0.03, ΔZ LAS: -0.03



North



South



East



West

Point: 119 Urban Area

Survey X: 300168.68, Survey Y: 258229.9, Z1: 760.62, Z DEM: 760.67, Z LAS: 760.6, ΔZ DEM: 0.05, ΔZ LAS: -0.02



North



South



East



West

Point: 120 Urban Area

Survey X: 314081.44, Survey Y: 292125.99, Z1: 908.29, Z DEM: 908.38, Z LAS: 908.33, ΔZ DEM: 0.1, ΔZ LAS: 0.05



North



South



East



West

Point: 121 Tall Weeds

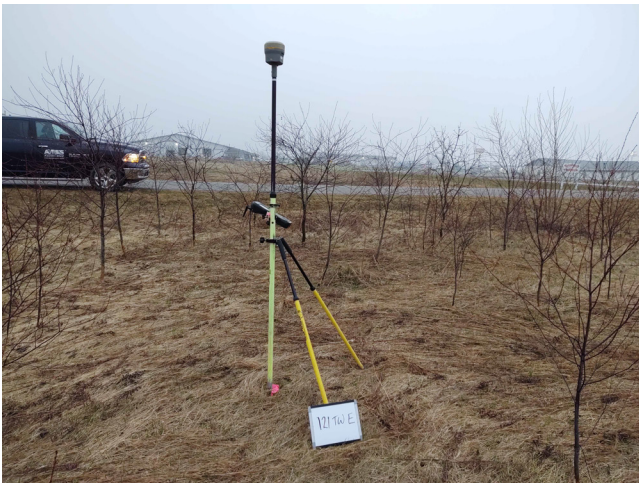
Survey X: 314025.6, Survey Y: 291781.41, Z1: 904.08, Z DEM: 904.22, Z LAS: 904.29, ΔZ DEM: 0.14, ΔZ LAS: 0.21



North



South



East



West

Point: 122 Bare Earth

Survey X: 306058.74, Survey Y: 295113.64, Z1: 884.67, Z DEM: 884.88, Z LAS: 884.88, ΔZ DEM: 0.21, ΔZ LAS: 0.21



North



South



East



West

Point: 123 Bare Earth

Survey X: 328417.86, Survey Y: 289699.89, Z1: 910.83, Z DEM: 911, Z LAS: 910.97, ΔZ DEM: 0.18, ΔZ LAS: 0.15



North



South



East



West

Point: 124 Forest

Survey X: 328550.87, Survey Y: 289901.38, Z1: 909.45, Z DEM: 909.64, Z LAS: 909.64, ΔZ DEM: 0.19, ΔZ LAS: 0.19



North



South



East



West

Point: 125 Tall Weeds

Survey X: 328364.14, Survey Y: 289913.67, Z1: 910.04, Z DEM: 910.22, Z LAS: 910.25, ΔZ DEM: 0.18, ΔZ LAS: 0.22



North



South



East



West

Point: 126 Urban Area

Survey X: 328318.71, Survey Y: 290151.91, Z1: 911.44, Z DEM: 911.57, Z LAS: 911.57, ΔZ DEM: 0.13, ΔZ LAS: 0.14



North



South



East



West

Point: 127 Urban Area

Survey X: 351225.93, Survey Y: 294160.1, Z1: 907.3, Z DEM: 907.34, Z LAS: 907.36, ΔZ DEM: 0.03, ΔZ LAS: 0.06



North



South



East



West

Point: 128 Bare Earth

Survey X: 351236.45, Survey Y: 294084.25, Z1: 908.5, Z DEM: 908.53, Z LAS: 908.5, ΔZ DEM: 0.03, ΔZ LAS: 0



North



South



East



West

Point: 129 Urban Area

Survey X: 347596.41, Survey Y: 276686.47, Z1: 882.38, Z DEM: 882.47, Z LAS: 882.4, ΔZ DEM: 0.1, ΔZ LAS: 0.03



North



South



East



West

Point: 130 Bare Earth

Survey X: 347731.65, Survey Y: 276457.07, Z1: 882.58, Z DEM: 882.64, Z LAS: 882.63, ΔZ DEM: 0.06, ΔZ LAS: 0.06



North



South



East



West

Point: 131 Bare Earth

Survey X: 399572.5, Survey Y: 284846.04, Z1: 945.47, Z DEM: 945.51, Z LAS: 945.45, ΔZ DEM: 0.04, ΔZ LAS: -0.02



North



South



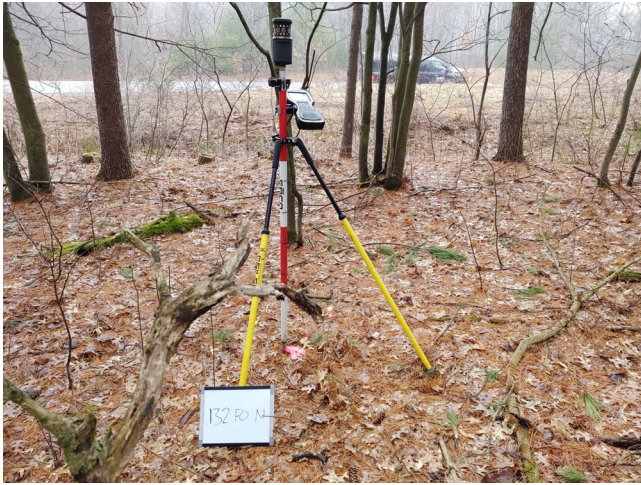
East



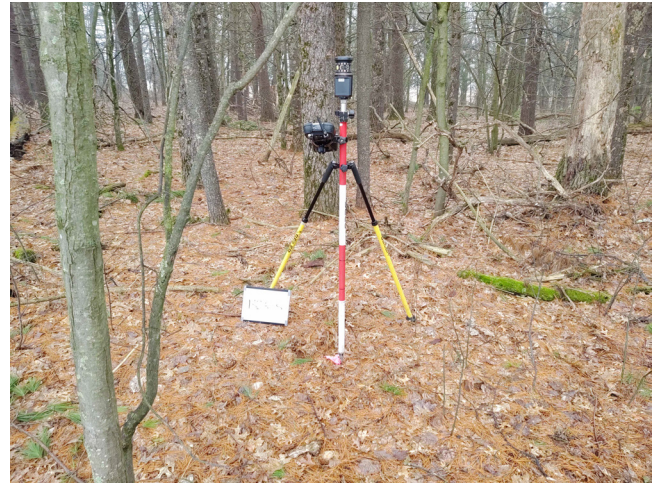
West

Point: 132 Forest

Survey X: 394918.92, Survey Y: 284892.94, Z1: 937.7, Z DEM: 937.98, Z LAS: 938.09, ΔZ DEM: 0.28, ΔZ LAS: 0.39



North



South



East



West

Point: 133 Urban Area

Survey X: 394819.66, Survey Y: 285007.58, Z1: 934.8, Z DEM: 934.89, Z LAS: 934.93, ΔZ DEM: 0.09, ΔZ LAS: 0.13



North



South



East



West

Point: 134 Tall Weeds

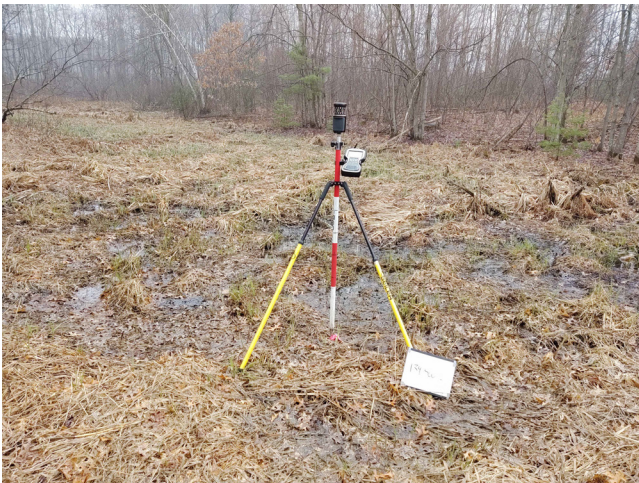
Survey X: 394845.3, Survey Y: 285115.11, Z1: 931.25, Z DEM: 931.47, Z LAS: 931.55, ΔZ DEM: 0.23, ΔZ LAS: 0.3



North



South



East



West

Point: 135 Urban Area

Survey X: 396923.84, Survey Y: 262896.39, Z1: 930.02, Z DEM: 930.11, Z LAS: 930.05, ΔZ DEM: 0.1, ΔZ LAS: 0.03



North



South



East



West

Point: 136 Bare Earth

Survey X: 396895.38, Survey Y: 262459.08, Z1: 931.37, Z DEM: 931.4, Z LAS: 931.38, ΔZ DEM: 0.03, ΔZ LAS: 0.01



North



South



East



West

Point: 137 Forest

Survey X: 396959.67, Survey Y: 263022.34, Z1: 916.75, Z DEM: 916.9, Z LAS: 916.92, ΔZ DEM: 0.15, ΔZ LAS: 0.18



North



South



East



West

Point: 138 Tall Weeds

Survey X: 393503.1, Survey Y: 261151.92, Z1: 1004.47, Z DEM: 1004.81, Z LAS: 1004.81, ΔZ DEM: 0.33, ΔZ LAS: 0.34



North



South



East



West

Point: 139 Urban Area

Survey X: 392902.66, Survey Y: 248130.58, Z1: 991.06, Z DEM: 991.24, Z LAS: 991.12, ΔZ DEM: 0.19, ΔZ LAS: 0.06



North



South



East



West

Point: 140 Tall Weeds

Survey X: 392807.5, Survey Y: 248074.57, Z1: 985.66, Z DEM: 985.86, Z LAS: 985.9, ΔZ DEM: 0.2, ΔZ LAS: 0.24



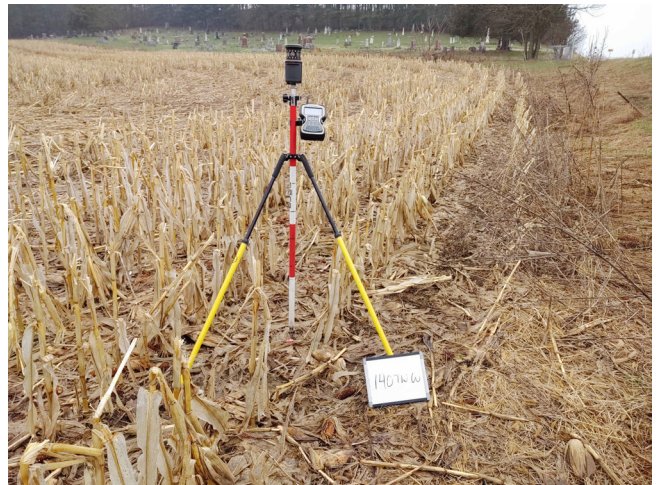
North



South



East



West

Point: 141 Forest

Survey X: 392757.45, Survey Y: 248344.44, Z1: 998.29, Z DEM: 998.45, Z LAS: 998.46, ΔZ DEM: 0.16, ΔZ LAS: 0.17



North



South



East



West

Point: 142 Bare Earth

Survey X: 392775.49, Survey Y: 248184.44, Z1: 995.67, Z DEM: 995.81, Z LAS: 995.79, ΔZ DEM: 0.13, ΔZ LAS: 0.12



North



South



East



West

Point: 143 Urban Area

Survey X: 413003.82, Survey Y: 218888.93, Z1: 1071.77, Z DEM: 1071.93, Z LAS: 1071.88, ΔZ DEM: 0.16, ΔZ LAS: 0.11



North



South



East



West

Point: 144 Tall Weeds

Survey X: 412946.28, Survey Y: 218785.55, Z1: 1058.58, Z DEM: 1058.74, Z LAS: 1058.82, ΔZ DEM: 0.17, ΔZ LAS: 0.24



North



South



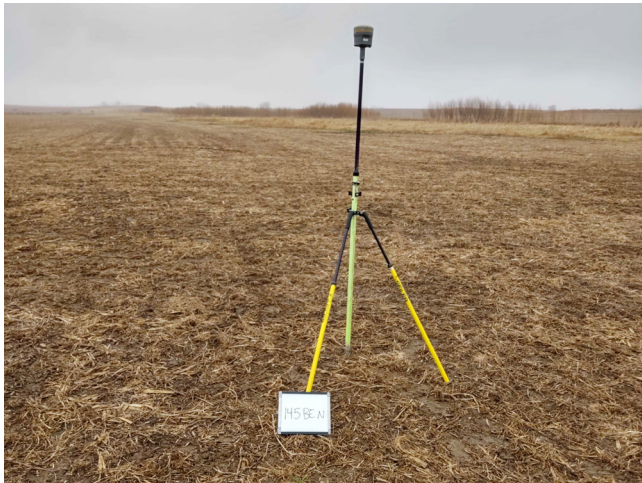
East



West

Point: 145 Bare Earth

Survey X: 411381.2, Survey Y: 218930.56, Z1: 1030.08, Z DEM: 1030.13, Z LAS: 1030.13, ΔZ DEM: 0.05, ΔZ LAS: 0.05



North



South



East



West

Point: 146 Urban Area

Survey X: 352995.08, Survey Y: 266920.93, Z1: 884.46, Z DEM: 884.39, Z LAS: 884.38, ΔZ DEM: -0.07, ΔZ LAS: -0.07



North



South



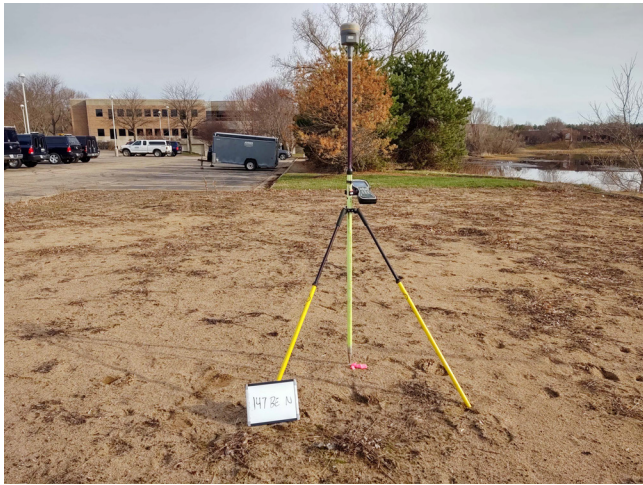
East



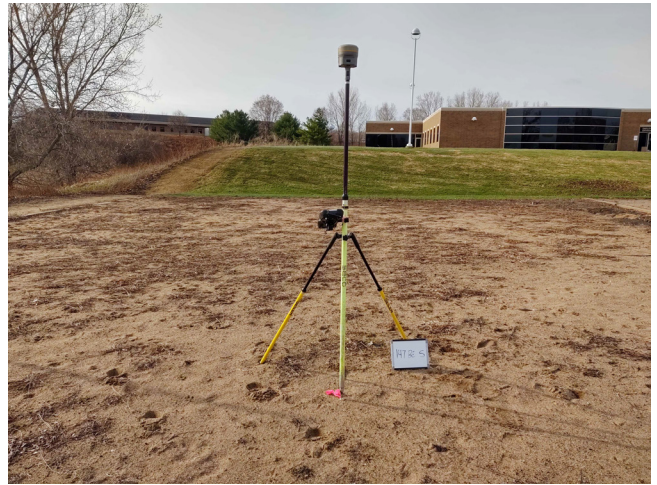
West

Point: 147 Bare Earth

Survey X: 353040.83, Survey Y: 266925.19, Z1: 884.03, Z DEM: 884.13, Z LAS: 884.17, ΔZ DEM: 0.11, ΔZ LAS: 0.14



North



South



East



West

Point: 148 Urban Area

Survey X: 358839.42, Survey Y: 264967.66, Z1: 900.83, Z DEM: 900.96, Z LAS: 900.98, ΔZ DEM: 0.13, ΔZ LAS: 0.15



North



South



East



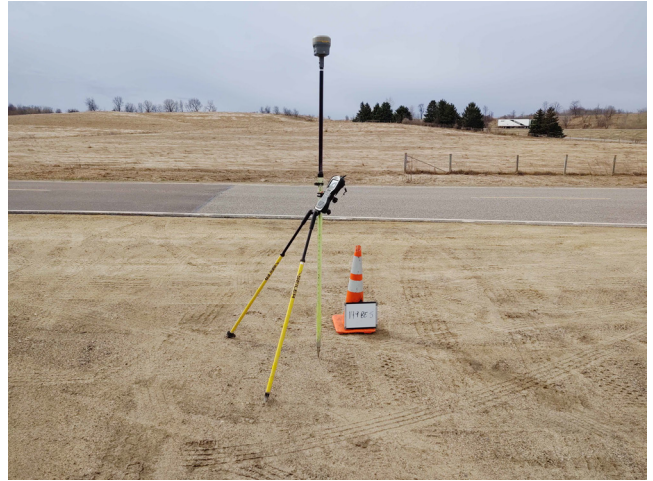
West

Point: 149 Bare Earth

Survey X: 390246.62, Survey Y: 217226.38, Z1: 987.32, Z DEM: 987.43, Z LAS: 987.39, ΔZ DEM: 0.12, ΔZ LAS: 0.08



North



South



East



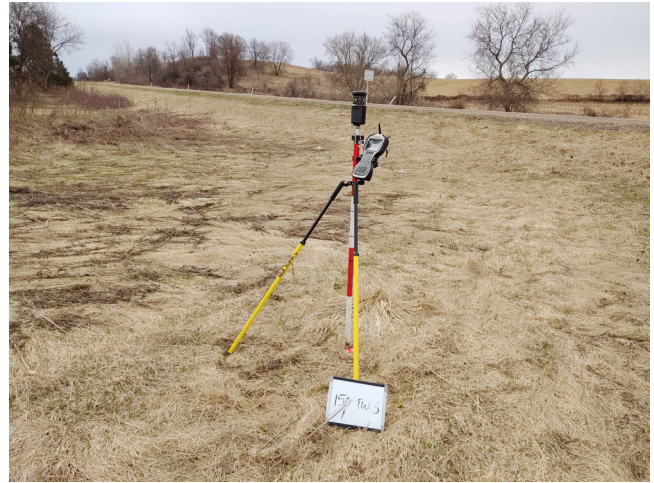
West

Point: 150 Tall Weeds

Survey X: 389370.87, Survey Y: 217160.72, Z1: 979.99, Z DEM: 980.22, Z LAS: 980.24, ΔZ DEM: 0.23, ΔZ LAS: 0.25



North



South



East



West

Point: 151 Urban Area

Survey X: 388798.24, Survey Y: 217289.13, Z1: 981.53, Z DEM: 981.64, Z LAS: 981.65, ΔZ DEM: 0.11, ΔZ LAS: 0.12



North



South



East



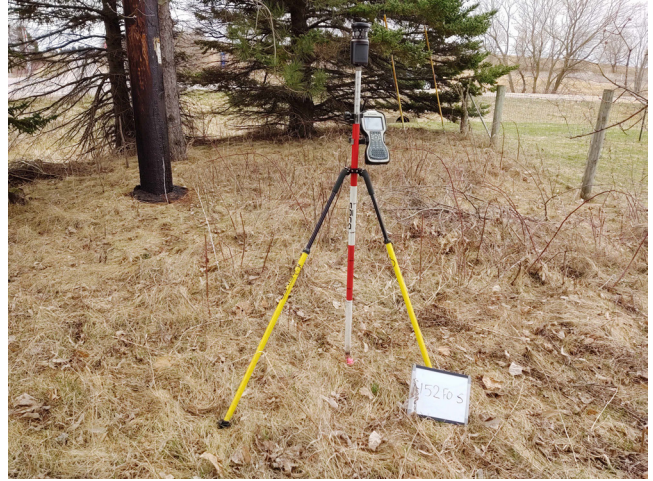
West

Point: 152 Forest

Survey X: 389158.39, Survey Y: 217367.53, Z1: 981.1, Z DEM: 981.36, Z LAS: 981.38, ΔZ DEM: 0.27, ΔZ LAS: 0.28



North



South



East



West

Point: 153 Forest

Survey X: 431458.26, Survey Y: 212265.59, Z1: 1081.34, Z DEM: 1081.6, Z LAS: 1081.71, ΔZ DEM: 0.26, ΔZ LAS: 0.36



North



South



East



West

Point: 154 Bare Earth

Survey X: 436714.05, Survey Y: 229412, Z1: 958.14, Z DEM: 958.27, Z LAS: 958.24, ΔZ DEM: 0.13, ΔZ LAS: 0.11



North



South



East



West

Point: 155 Urban Area

Survey X: 437111.6, Survey Y: 229137.78, Z1: 963.75, Z DEM: 963.91, Z LAS: 963.8, ΔZ DEM: 0.16, ΔZ LAS: 0.05



North



South



East



West

Point: 156 Tall Weeds

Survey X: 437350.23, Survey Y: 228973.08, Z1: 964.27, Z DEM: 964.56, Z LAS: 964.61, ΔZ DEM: 0.28, ΔZ LAS: 0.34



North



South



East



West

Point: 157 Urban Area

Survey X: 479056.49, Survey Y: 201426.62, Z1: 1076.01, Z DEM: 1075.95, Z LAS: 1075.97, ΔZ DEM: -0.06, ΔZ LAS: -0.04



North



South



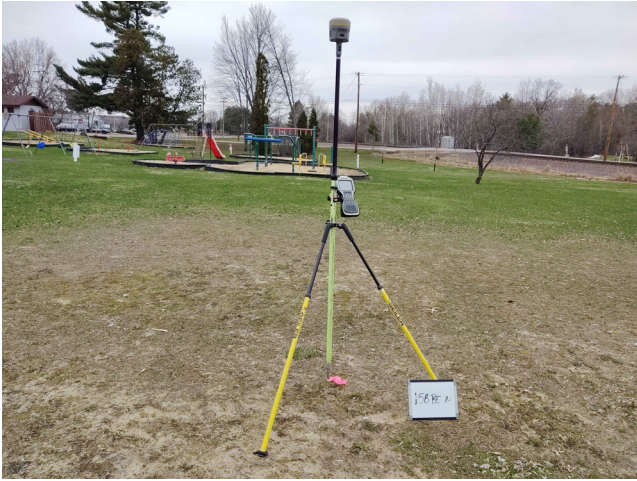
East



West

Point: 158 Bare Earth

Survey X: 479143.8, Survey Y: 201418.78, Z1: 1074.64, Z DEM: 1074.6, Z LAS: 1074.64, ΔZ DEM: -0.04, ΔZ LAS: -0.01



North



South



East



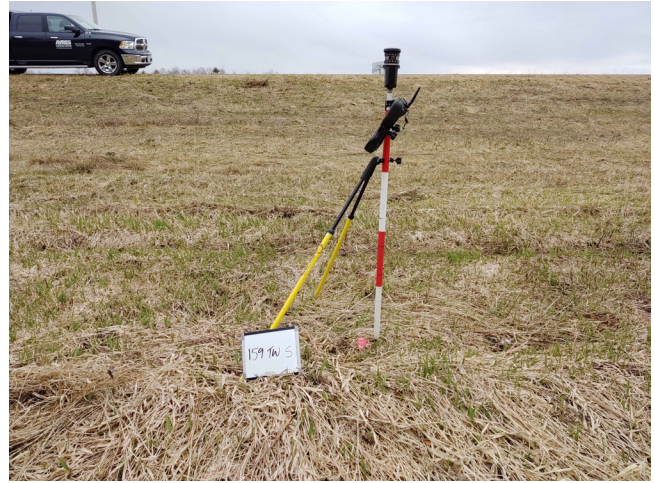
West

Point: 159 Tall Weeds

Survey X: 487657.12, Survey Y: 200507.96, Z1: 1063.88, Z DEM: 1064.02, Z LAS: 1064.04, ΔZ DEM: 0.14, ΔZ LAS: 0.15



North



South



East



West

Point: 160 Forest

Survey X: 487434.87, Survey Y: 200549.58, Z1: 1065.77, Z DEM: 1065.89, Z LAS: 1065.94, ΔZ DEM: 0.12, ΔZ LAS: 0.17



North



South



East



West

Point: 161 Bare Earth

Survey X: 470622.43, Survey Y: 237375.1, Z1: 982.28, Z DEM: 982.42, Z LAS: 982.38, ΔZ DEM: 0.14, ΔZ LAS: 0.1



North



South



East



West

Point: 162 Urban Area

Survey X: 465321.84, Survey Y: 235547.32, Z1: 973.24, Z DEM: 973.36, Z LAS: 973.19, ΔZ DEM: 0.12, ΔZ LAS: -0.05



North



South



East



West

Point: 163 Urban Area

Survey X: 436538.45, Survey Y: 284706.46, Z1: 1068.1, Z DEM: 1068.28, Z LAS: 1068.21, ΔZ DEM: 0.18, ΔZ LAS: 0.1



North



South



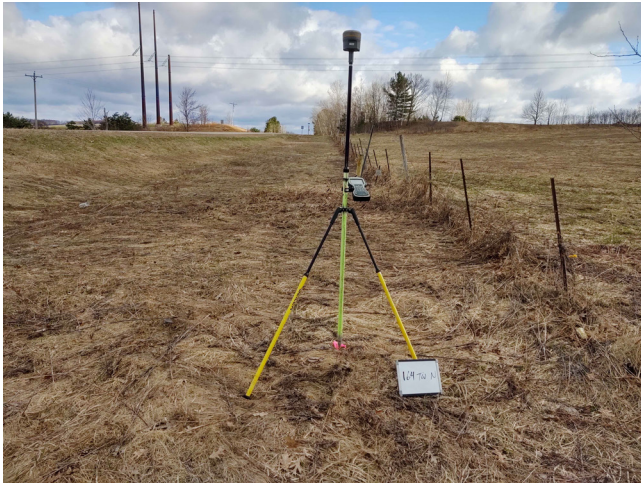
East



West

Point: 164 Tall Weeds

Survey X: 436614.91, Survey Y: 274188.15, Z1: 1073.55, Z DEM: 1073.76, Z LAS: 1073.75, ΔZ DEM: 0.21, ΔZ LAS: 0.2



North



South



East



West

Point: 165 Forest

Survey X: 436617.31, Survey Y: 274069.03, Z1: 1072.48, Z DEM: 1072.73, Z LAS: 1072.7, ΔZ DEM: 0.25, ΔZ LAS: 0.22



North



South



East



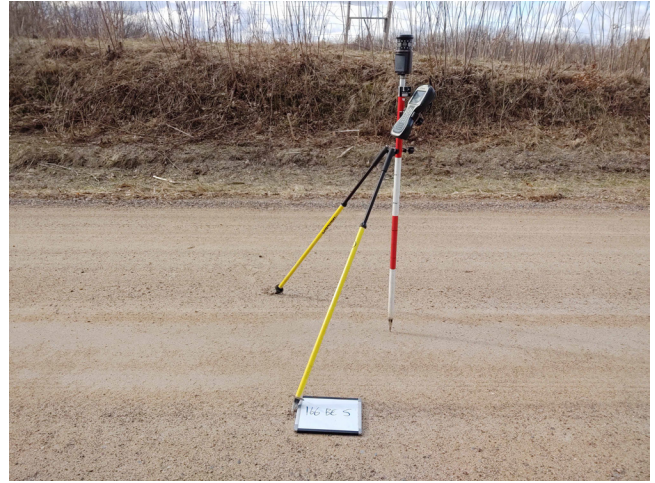
West

Point: 166 Bare Earth

Survey X: 437051.53, Survey Y: 274612.3, Z1: 1103.42, Z DEM: 1103.56, Z LAS: 1103.46, ΔZ DEM: 0.14, ΔZ LAS: 0.04



North



South



East



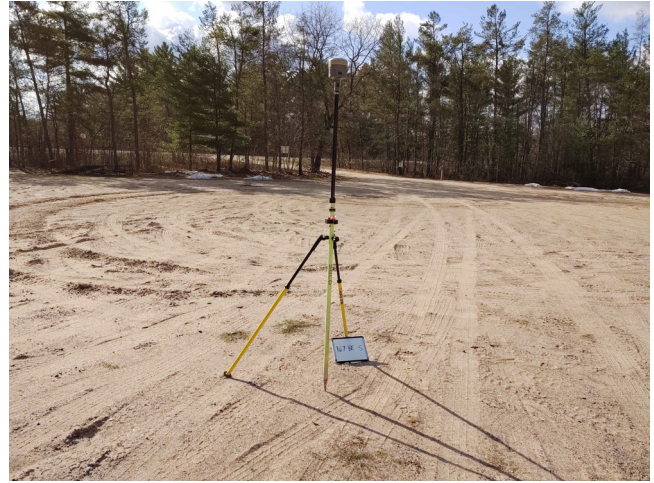
West

Point: 167 Bare Earth

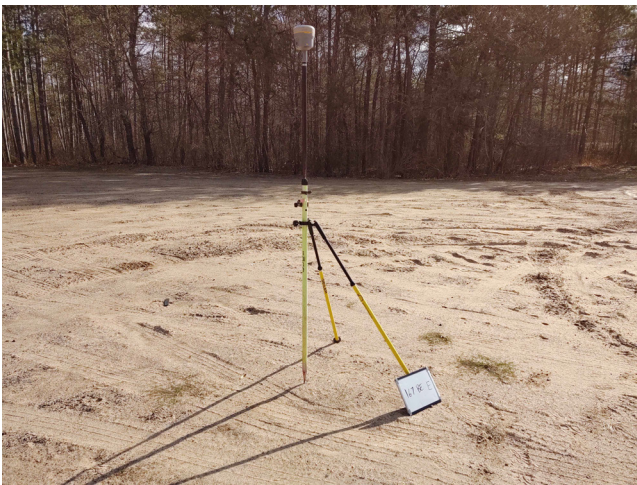
Survey X: 455243.32, Survey Y: 255383.8, Z1: 918.63, Z DEM: 918.56, Z LAS: 918.5, ΔZ DEM: -0.07, ΔZ LAS: -0.13



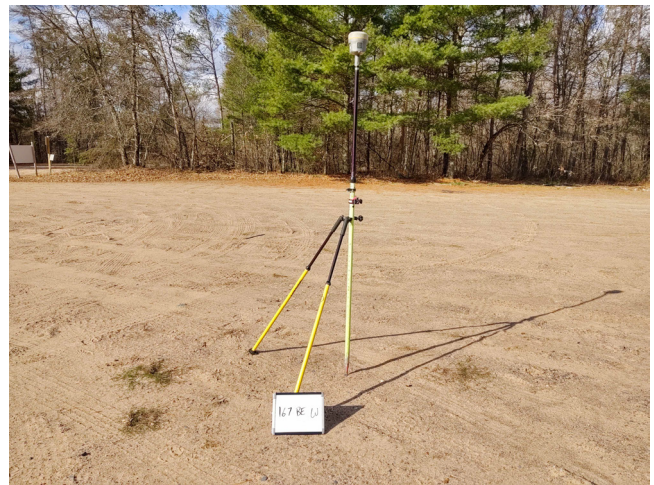
North



South



East



West

Point: 168 Urban Area

Survey X: 454807.3, Survey Y: 254875.63, Z1: 920.42, Z DEM: 920.41, Z LAS: 920.37, ΔZ DEM: -0.01, ΔZ LAS: -0.05



North



South



East



West

Point: 169 Tall Weeds

Survey X: 484103.93, Survey Y: 250589.1, Z1: 987.43, Z DEM: 987.45, Z LAS: 987.45, ΔZ DEM: 0.03, ΔZ LAS: 0.03



North



South



East



West

Point: 170 Bare Earth

Survey X: 484113.99, Survey Y: 250647.76, Z1: 989.48, Z DEM: 989.34, Z LAS: 989.32, ΔZ DEM: -0.14, ΔZ LAS: -0.16



North



South



East



West

Point: 171 Urban Area

Survey X: 484151.5, Survey Y: 250646.65, Z1: 990.22, Z DEM: 990.11, Z LAS: 990.06, ΔZ DEM: -0.1, ΔZ LAS: -0.16



North



South



East



West

Point: 172 Forest

Survey X: 484045.89, Survey Y: 250462.7, Z1: 986.76, Z DEM: 986.82, Z LAS: 986.92, ΔZ DEM: 0.06, ΔZ LAS: 0.16



North



South



East



West

Point: 173 Tall Weeds

Survey X: 483917.73, Survey Y: 290293.98, Z1: 1010.43, Z DEM: 1010.34, Z LAS: 1010.31, ΔZ DEM: -0.09, ΔZ LAS: -0.11



North



South



East



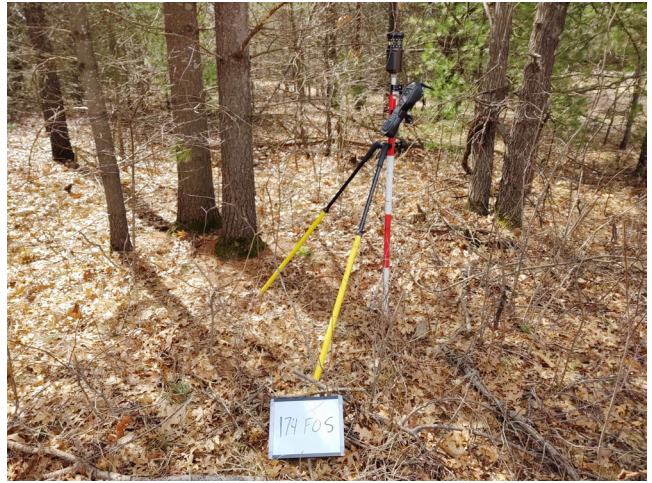
West

Point: 174 Forest

Survey X: 483969.53, Survey Y: 290314.21, Z1: 1010.9, Z DEM: 1011.03, Z LAS: 1011.06, ΔZ DEM: 0.13, ΔZ LAS: 0.16



North



South



East



West

Point: 175 Bare Earth

Survey X: 483902.82, Survey Y: 290366.37, Z1: 1013.32, Z DEM: 1013.23, Z LAS: 1013.2, ΔZ DEM: -0.08, ΔZ LAS: -0.12



North



South



East



West

Point: 176 Urban Area

Survey X: 483881.57, Survey Y: 290362.9, Z1: 1013.64, Z DEM: 1013.54, Z LAS: 1013.55, ΔZ DEM: -0.1, ΔZ LAS: -0.09



North



South



East



West

Point: 177 Tall Weeds

Survey X: 460243.96, Survey Y: 285071.37, Z1: 987.3, Z DEM: 987.45, Z LAS: 987.51, ΔZ DEM: 0.15, ΔZ LAS: 0.22



North



South



East



West

Point: 178 Urban Area

Survey X: 460239.15, Survey Y: 285137.91, Z1: 988.78, Z DEM: 988.9, Z LAS: 988.94, ΔZ DEM: 0.12, ΔZ LAS: 0.16



North



South



East



West

Point: 179 Forest

Survey X: 460300.7, Survey Y: 285465.9, Z1: 988.68, Z DEM: 988.75, Z LAS: 988.88, ΔZ DEM: 0.07, ΔZ LAS: 0.2



North



South



East



West