

GROUND CONTROL SURVEY REPORT

**GPS SURVEY
FOR LIDAR CONTROL**

OCONTO COUNTY LIDAR SURVEY

OCONTO COUNTY, WISCONSIN

Services provided by:

AVRES

ASSOCIATES

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ABSTRACT

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This report documents the GPS ground surveys conducted in support of LIDAR data collection for Oconto County, Wisconsin. The data was collected during June, 2005. The ground control stations were established utilizing four Trimble 4000 SSE receivers, three Trimble 4000 SSI receivers and one Trimble 4700 receiver with fixed-height tripods, seven Trimble Compact L1/L2 antennas with ground plane and one Trimble microcentered L1/L2 antenna with ground plane. There were no problems encountered during this survey.

Following the control network surveys, surveys were conducted at 9 sites utilizing the base stations established in the static network. These surveys established "Ground Truth" data at each site on different surface types, including dirt, sand, asphalt, mowed grass and limestone.

Statistical comparisons were made between ground truth points collected in the survey and airborne LIDAR points which fell within 1 meter of the ground truth points.

MAIN REPORT

STATIC GPS SUMMARY

The Standard Operating Procedure for the data collection includes a geodetic control network plan designed to maximize the use of the highest order control points in the area of interest, and to optimize the spatial distribution of geodetic control across the network.

Also included is the simultaneous occupation of points designed to provide redundant vectors and loop closures, as well as a collection of a superfluity of points to compare observed values against published values of geodetic control points.

In addition, the static GPS network was established to verify the compatibility and correlation of existing published NGS controls in the project area. Horizontal and vertical constraints were selected based on the order of accuracy and correlation of the controls selected.

PRELIMINARY ANALYSIS

The baselines were processed using Trimble Geomatics Office's baseline processing module, WAVE (*Weighted Ambiguity Vector Estimator*). Ionosphere-free fixed solutions were found to provide the best results. Preliminary blunder detections were undertaken using "Redundant Vectors" and Global Network Closures and any extremely large errors were eliminated.

MINIMALLY CONSTRAINED ADJUSTMENT

The data are then processed using a minimally constrained geodetic control network to test the network internally, without external constraints, and produce a statistical summary. The statistics from this process are required to be within the tolerance outlined in the Geometric Geodetic Accuracy Standards and Specifications for using GPS Relative Positioning Techniques, published by the FGCC. These tolerances are represented as ellipsoids showing the margin of error value on a graph of the theoretical points, covariance values that indicate the degree of error of the vectors relative to the other vectors in the network, and a chi-squared test that compares the predicted variance determined through a least-squares analysis to the observed variance. The summary is evaluated to eliminate vectors that are outside of the error tolerances to be replaced with redundant vectors that are within the tolerances until all tolerances are met.

FULLY CONSTRAINED ADJUSTMENT

The quality of the existing horizontal controls is assessed before undertaking the constrained adjustment. Geodetic inverses between the published NAD83 Coordinates of existing stations were compared with the geodetic inverses derived from the minimally constrained least square adjustment results. This distance analysis is especially useful,

since it provides a datum invariant means of comparison.

Once the minimally constrained network satisfies the requirements of the above tests, the highest order control points in the control network are selected with an optimum spatial relationship to fully constrain the network to known control points, and have their published values entered as the position for those points and the network re-adjusted. The fully constrained report is given in Section 3-A. The same statistical tests are rerun on the adjusted network, as well as visually comparing adjusted values of geodetic control points to published values of control points not used as constraints. Again, the summary is evaluated to identify vectors outside of the tolerances and constraining points reselected to obtain the best fit to the geoid where all vectors are within the prescribed tolerances.

ERROR ELLIPSES

The adjustment results show that the a posteriori variance factor of the network was close to 1.0, as should be desired, and passed the χ^2 test. None of the residual components in the network were flagged for possible rejection under the τ -max test at the 0.05 level of significance. The relative confidence ellipses reveal that the horizontal positional accuracy between all directly connected pairs of stations in the network were better than (1:100,000) at the 95% level of confidence. The horizontal and vertical Error ellipses are included in this report in Section 3-B.

GROUND TRUTH SUMMARY

Surveys were conducted to establish ground truth data at representative sites throughout the project area. These sites were selected on the basis of the various types of ground surfaces and vegetation covers that would be encountered by the LIDAR surveys. As a quality control measure, a number of “check-in” points consisted of published horizontal and vertical control points within the area. The base stations used to collect survey data were included in the static GPS network, and were selected on the basis of their having an unobstructed view of the sky, as well as being in a location considered favorable for collecting ground truth data. The vertical and horizontal accuracy of each base station was determined by the statistical tests performed in the least squares adjustment process.

SAMPLE POINTS / TEST POINTS

The test points were distributed and categorized into sites as shown in the Project Area Site Map attached in this report (Section 4-A). These sites were selected on the basis of various types of ground surfaces and vegetation covers. At the time of LIDAR data acquisition, checkpoints were collected on surfaces with dirt, sand, asphalt, mowed grass and limestone.

DATA ANALYSIS

Data analysis was accomplished by comparing ground truth checkpoints with LIDAR points from the edited data set, which were within 1 meter horizontally from the ground truth points. The only exception to this would be the ground truth points collected under tree canopy, where comparisons could be made with LIDAR pulses that fell within 3 meters of the check points. This is because fewer LIDAR pulses are able to reach the ground in heavily forested areas, so the point spacing is larger than in cleared areas. Based on the number of returns and the density of points in this project, it was not necessary to compare to anything further away than 1 meter from the ground truth points. Note that the edited LIDAR points are simply a subset of the raw LIDAR points. The points that fell above the ground surface on vegetation canopies, buildings, or other obstructions were removed from the data set.

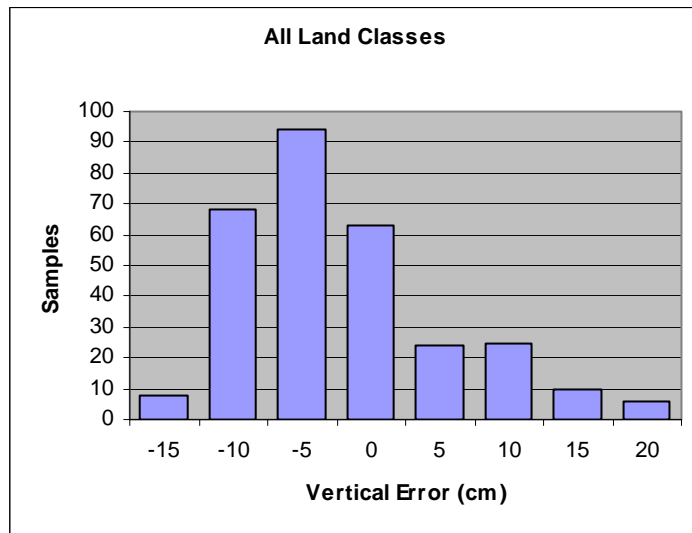
LIDAR POINT COMPARISON

The result of the comparisons of these values indicated a Vertical Root Mean Square Error (RMSEz) of 8.09 centimeters, which equates to Vertical Accuracy of 15.86 centimeters at the 95 percent confidence level.

OVERALL ACCURACY

A comparison of these values indicated a Vertical Root Mean Square Error (RMSEz) of 8.09 centimeters. This is within the vertical accuracy tolerance. The mean elevation difference for all points is -2.46 centimeters. Skewness is 0.87, indicating an approximately normal distribution. Descriptive statistics and a histogram of the vertical error distribution for all samples are shown below.

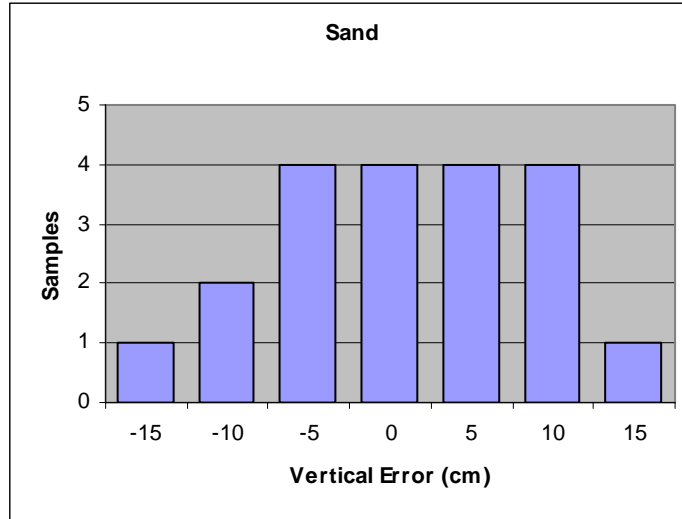
All Land Classes (cm)	
RMSEz	8.09
Mean	-2.46
Standard Error	0.45
Median	-4
Mode	-6
Standard Deviation	7.72
Sample Variance	59.59
Kurtosis	0.12
Skewness	0.87
Range	34
Minimum	-15
Maximum	19
Count	298



SAND

This set includes only those points that were collected in areas of sand surfaces. The resulting RMSEz is 8.60 centimeters, which is within the accuracy specification. The skewness value is -0.10.

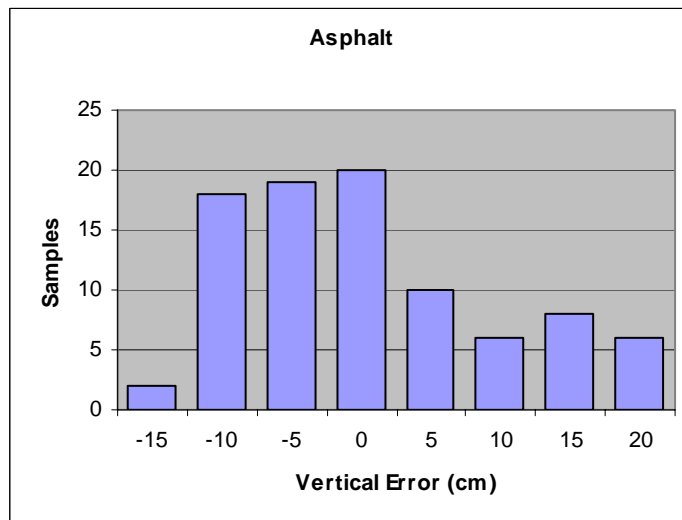
Sand (cm)	
RMSEz	8.60
Mean	0.60
Standard Error	1.87
Median	-1
Mode	5
Standard Deviation	8.38
Sample Variance	70.15
Kurtosis	-1.03
Skewness	-0.10
Range	28
Minimum	-15
Maximum	13
Count	20



ASPHALT

This set includes only those points that were collected in areas of asphalt surfaces. The resulting RMSEz is 12.50 centimeters. The large range seen in the asphalt class may be caused by having comparisons in both old and fresh asphalt, which can affect the reflectivity of the surface.

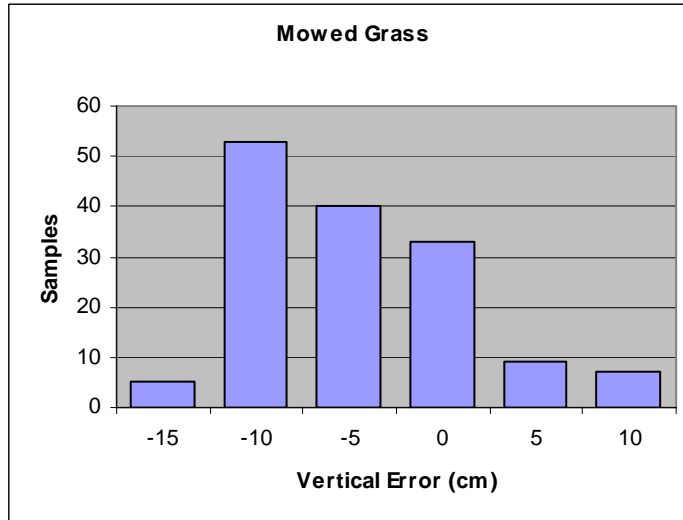
Asphalt (cm)	
RMSEz	12.50
Mean	0.20
Standard Error	1.00
Median	-1
Mode	-6
Standard Deviation	9.41
Sample Variance	88.50
Kurtosis	-0.76
Skewness	0.58
Range	32
Minimum	-13
Maximum	19
Count	89



MOWED GRASS

This set includes only those points that were collected in areas of mowed grass surfaces. The resulting RMSEz is 8.30 centimeters, which is within the accuracy specifications.

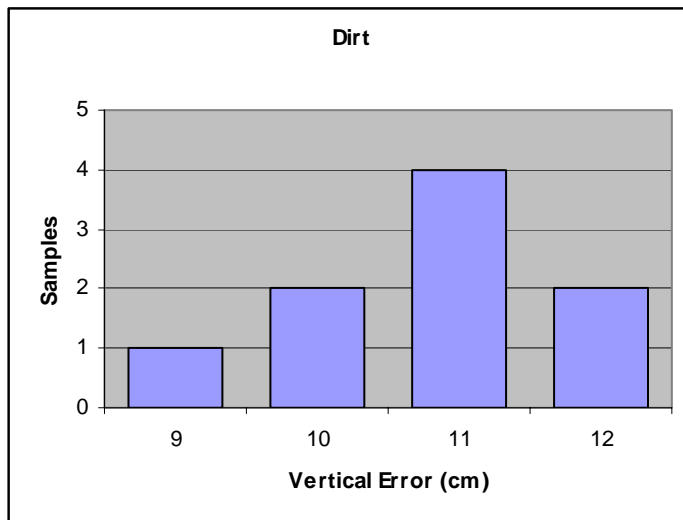
Mowed Grass (cm)	
RMSEz	8.30
Mean	-4.71
Standard Error	0.47
Median	-5
Mode	-10
Standard Deviation	5.70
Sample Variance	32.44
Kurtosis	-0.21
Skewness	0.61
Range	24
Minimum	-13
Maximum	11
Count	147



DIRT

This set includes only those points that were collected in areas of dirt. The resulting RMSEz is 12.40 centimeters, which is within the accuracy specifications.

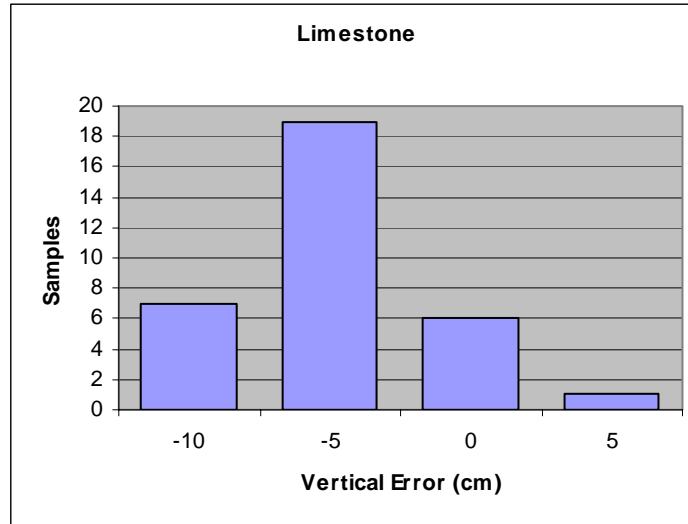
Dirt (cm)	
RMSEz	12.40
Mean	10.78
Standard Error	0.32
Median	11
Mode	11
Standard Deviation	0.97
Sample Variance	0.94
Kurtosis	-0.01
Skewness	-0.50
Range	3
Minimum	9
Maximum	12
Count	9



LIMESTONE

This set includes only those points that were collected in areas of limestone. The resulting RMSEz is 7.50 centimeters, which is within the accuracy specifications.

Limestone (cm)	
RMSEz	7.50
Mean	-5.06
Standard Error	0.67
Median	-6
Mode	-6
Standard Deviation	3.82
Sample Variance	14.62
Kurtosis	-0.25
Skewness	0.43
Range	15
Minimum	-12
Maximum	3
Count	33



GPS NETWORK

A. Fully Constrained

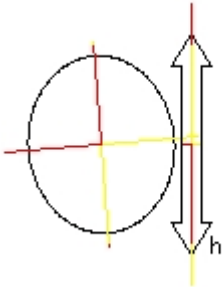
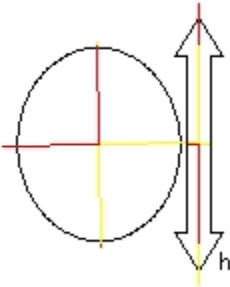
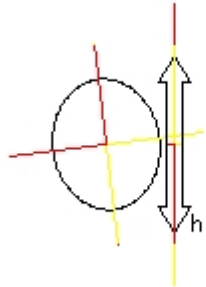
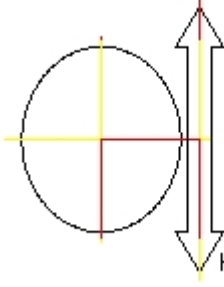
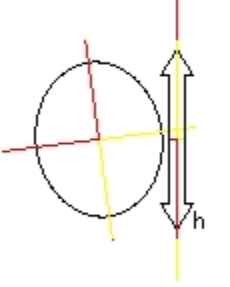
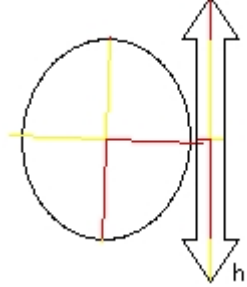
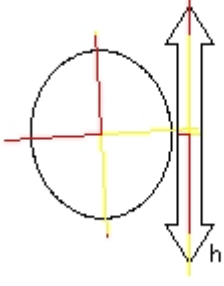
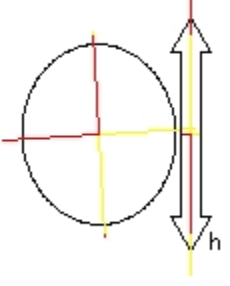
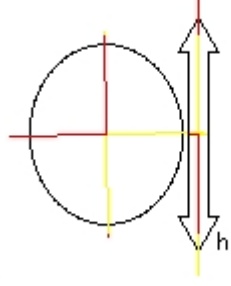
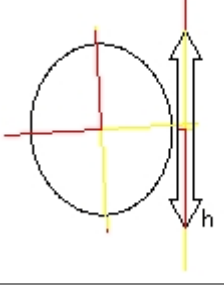
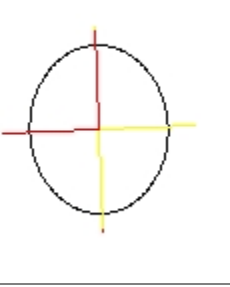
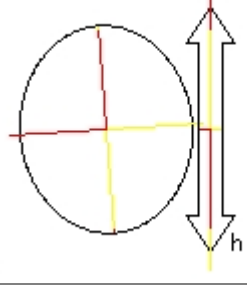
Oconto, Wisconsin
 LIDAR Ground Truth
 GPS Control Network
 (Fully-Constrained Adjustment)

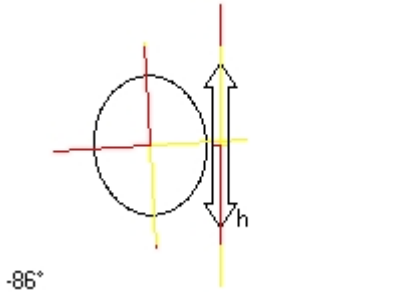
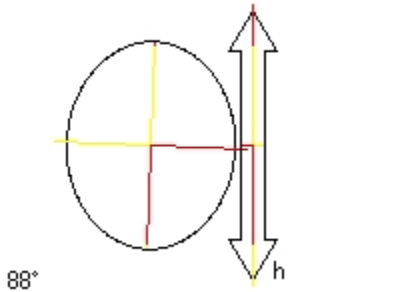
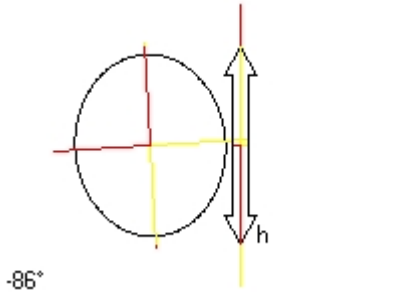
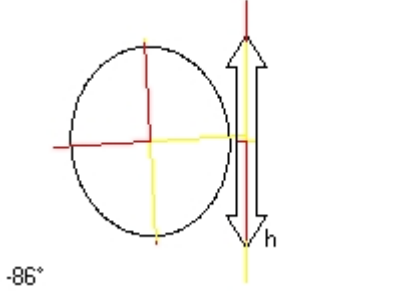
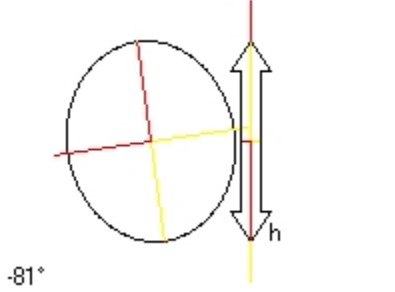
Horizontal Datum: NAD83
 Units: meters

Name	Latitude	Longitude	Ellipsoid Ht
BOWM	45°10'03.10192"N	88°26'25.25367"W	248.416
DOLA	44°53'18.15318"N	88°01'04.92174"W	151.013
G223	45°09'50.33248"N	88°27'03.32874"W	250.135
L023	44°47'13.39736"N	88°39'32.21791"W	221.554
L129	44°47'43.18454"N	87°55'14.29960"W	146.249
mil1	43°00'09.10203"N	87°53'18.38602"W	148.437
OC1B	45°19'36.07371"N	88°35'12.77218"W	377.965
OC1C	45°19'31.22639"N	88°35'12.58836"W	375.531
OC2B	45°18'04.97024"N	88°23'23.21148"W	300.717
OC2C	45°17'57.07723"N	88°23'23.46306"W	296.784
OC3B	45°11'11.53499"N	88°28'34.76316"W	261.069
OC3C	45°11'08.75873"N	88°28'29.99992"W	261.714
OC4B	45°01'41.64324"N	88°23'06.51982"W	215.692
OC4C	45°01'41.29231"N	88°23'15.26143"W	216.270
OC5B	44°54'45.89634"N	88°25'43.72542"W	208.687
OC5C	44°54'45.96113"N	88°25'54.71266"W	212.333
OC6B	44°59'21.55350"N	88°12'04.52906"W	217.214
OC6C	44°59'21.81369"N	88°11'58.63578"W	218.185
OC7C	44°57'00.28206"N	88°02'58.15087"W	180.884
OC8B	44°43'49.12992"N	88°11'56.58033"W	198.620
OC8C	44°43'48.81712"N	88°12'05.94633"W	198.274
OC9C	44°47'48.38748"N	87°55'14.44144"W	145.674
OU9C	44°47'48.38740"N	87°55'14.44144"W	145.671
Q222	45°04'09.80674"N	88°25'29.62528"W	237.618
STA6	44°57'04.27951"N	88°02'56.64523"W	181.420
stb1	44°47'43.71797"N	87°18'51.56477"W	149.882
stp1	44°18'14.18814"N	91°54'11.87214"W	354.734
sup2	45°44'58.10940"N	87°04'24.59927"W	154.800
WABE	45°28'20.86117"N	88°40'32.52962"W	451.265
WAUS	45°21'49.62216"N	87°57'14.64695"W	193.544
Y227	44°41'12.48651"N	88°14'32.80088"W	209.600

B. Error Ellipses

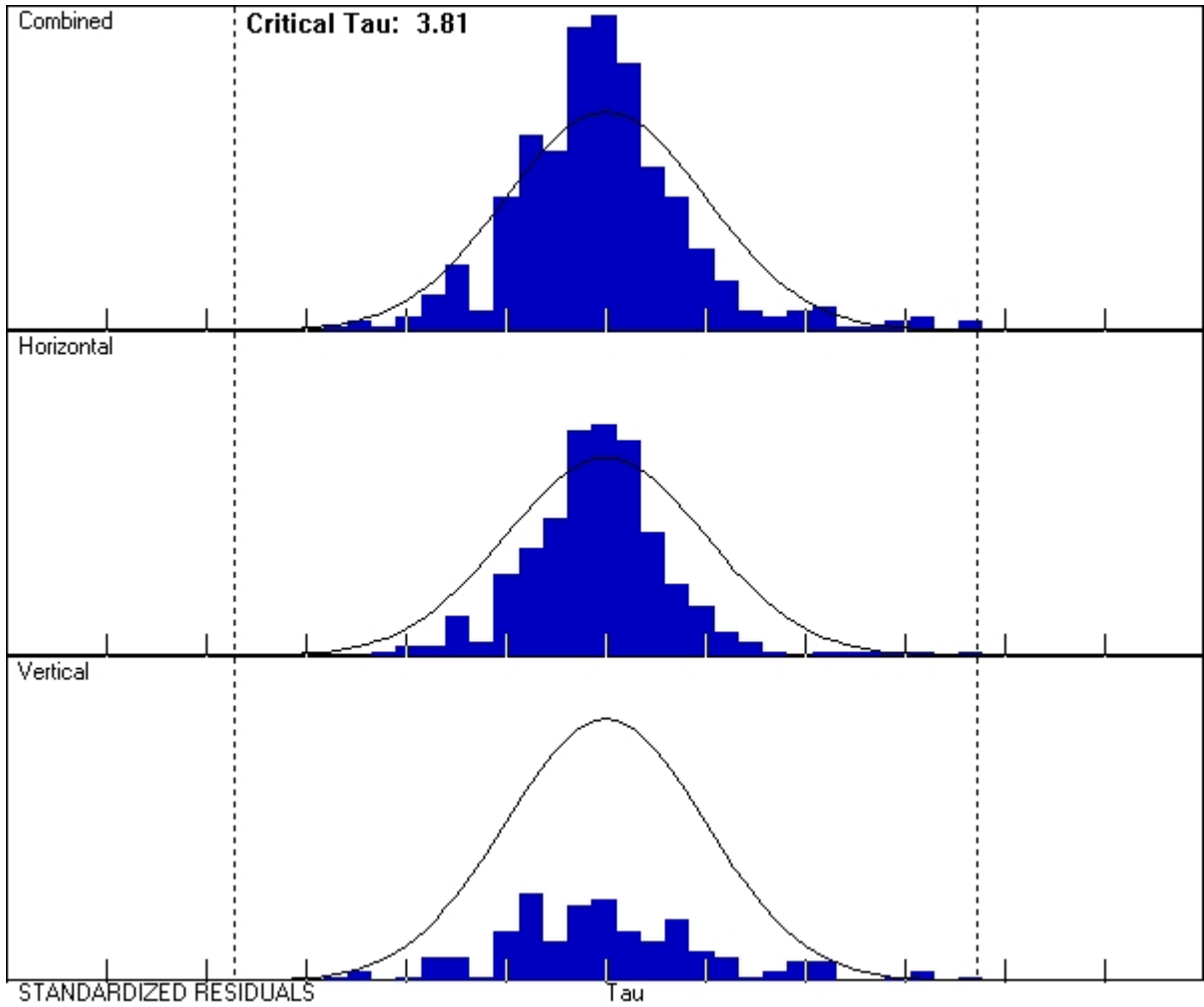
Point Error Ellipses

Q222	G223	WAUS
 <p style="text-align: left; margin-left: 5px;">-85°</p>	 <p style="text-align: left; margin-left: 5px;">-88°</p>	 <p style="text-align: left; margin-left: 5px;">-83°</p>
Tick Size: 0.0100m Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
OC2B	L023	OC1B
 <p style="text-align: left; margin-left: 5px;">89°</p>	 <p style="text-align: left; margin-left: 5px;">-82°</p>	 <p style="text-align: left; margin-left: 5px;">87°</p>
Tick Size: 0.0100m Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
WABE	BOWM	OC3B
 <p style="text-align: left; margin-left: 5px;">-86°</p>	 <p style="text-align: left; margin-left: 5px;">-87°</p>	 <p style="text-align: left; margin-left: 5px;">-88°</p>
Tick Size: 0.0100m Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
OC4B	Y227	OC6B
 <p style="text-align: left; margin-left: 5px;">-86°</p>	 <p style="text-align: left; margin-left: 5px;">-87°</p>	 <p style="text-align: left; margin-left: 5px;">-85°</p>
Tick Size: 0.0100m Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		

L129	STA6	OC5B
 <p data-bbox="191 520 235 548">-86°</p>	 <p data-bbox="605 520 649 548">88°</p>	 <p data-bbox="1019 520 1063 548">-86°</p>
<p data-bbox="310 569 1295 596">Tick Size: 0.0100m Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ</p>		
DOLA	OC8B	
 <p data-bbox="191 940 235 968">-86°</p>	 <p data-bbox="605 940 649 968">-81°</p>	
<p data-bbox="310 989 1295 1016">Tick Size: 0.0100m Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ</p>		

C. Histograms of Standardized Residuals

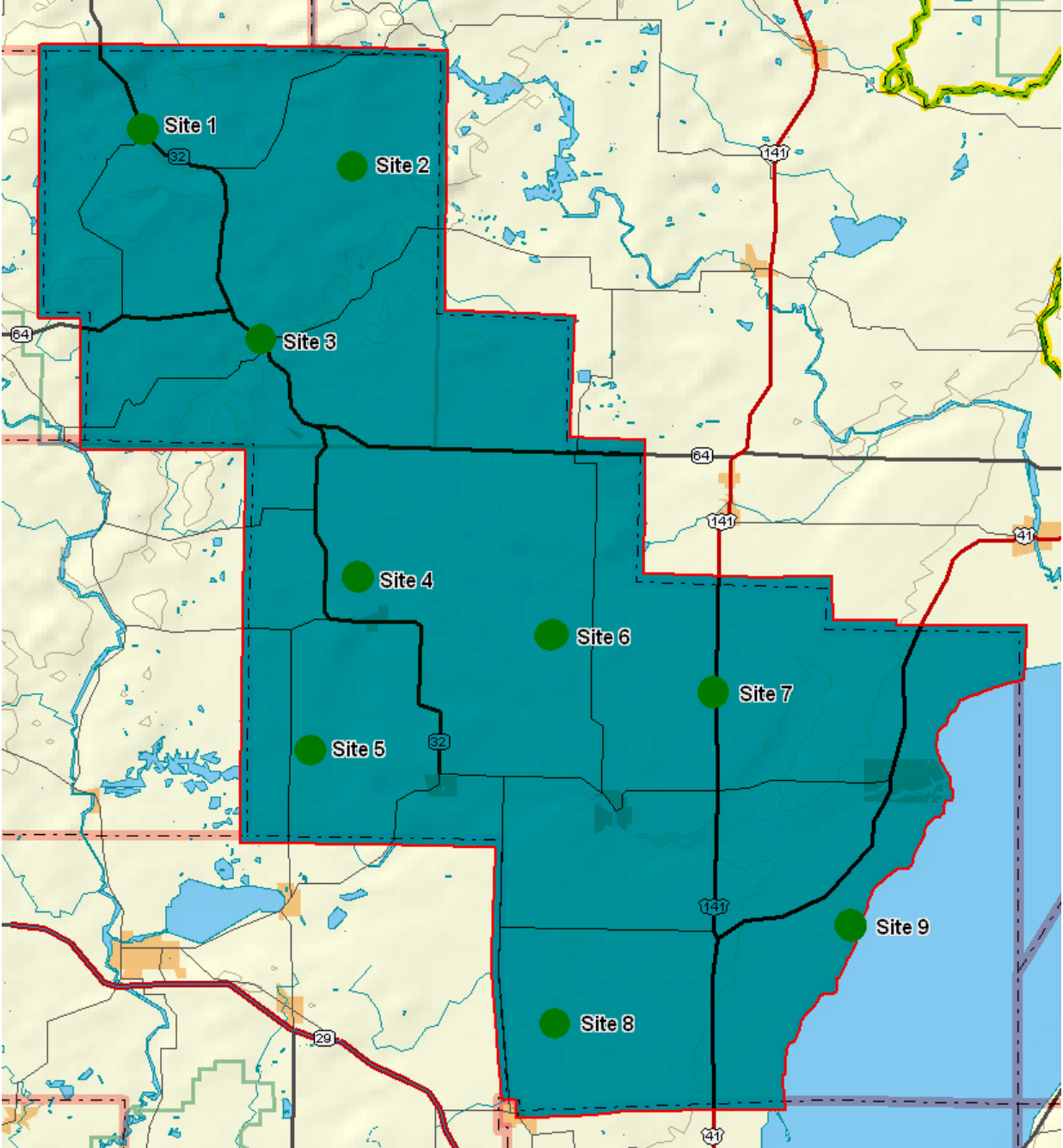
Histograms of Standardized Residuals



GROUND TRUTH SURVEY

A. Map of Ground Truth Locations

**Oconto County, Wisconsin
Ground Control Areas**



B. Ground Truth Analysis of LIDAR Points

Ground Check-Point Descriptive Codes

Surface Type		Sky Visibility		Surface Slope		Confidence	
1	Dirt	1	Open	1	Flat	1	Good
2	Sand	2	Part open	2	Slight Slope	2	Fair
3	Asphalt	3	Covered	3	Slope	3	Bad
4	Concrete						
5	Tall Grass						
6	Mowed Grass						
7	Trees and Brush						
8	Weeds and short grass						
9	Thick brush						
A	Thick cut grass						
B	Cultivated field - unplowed						
C	Limestone						
D	Trees and grass						
E	Gravel						
F	Brush and grass						

This table shows how the four character descriptive codes are assigned to each survey point in the ground control.

Example: 2111 = sand, open sky, flat slope, good confidence

GROUND TRUTH ANALYSIS
Comparison of LIDAR Points to RTK Ground-Truth Points

Horizontal units = meters (UTM 16 North, NAD83)

Vertical units = meters (NAVD88 – Geoid03)

Survey X	Survey Y	Survey Z	LIDAR X	LIDAR Y	LIDAR Z	dx	dy	dz	dist	Code
375642.64	5020399.91	376.82	375642.80	5020400.85	376.72	-0.16	-0.94	0.09	0.95	1111
375642.71	5020393.71	376.77	375642.41	5020394.46	376.67	0.30	-0.75	0.10	0.80	1111
375642.54	5020407.69	376.82	375643.18	5020407.19	376.72	-0.64	0.50	0.10	0.81	1111
375642.65	5020396.98	376.79	375642.54	5020396.62	376.68	0.11	0.36	0.11	0.37	1111
375642.59	5020401.72	376.83	375642.80	5020400.85	376.72	-0.21	0.88	0.11	0.90	1111
375642.59	5020403.62	376.83	375642.92	5020402.97	376.72	-0.33	0.65	0.11	0.73	1111
375642.54	5020407.69	376.82	375642.10	5020406.91	376.71	0.44	0.78	0.11	0.89	1111
375642.62	5020398.29	376.80	375642.67	5020398.75	376.68	-0.05	-0.46	0.12	0.46	1111
375642.59	5020405.64	376.83	375643.05	5020405.08	376.71	-0.46	0.56	0.12	0.73	1111
405339.78	4982483.74	218.38	405338.92	4982484.11	218.53	0.86	-0.38	-0.15	0.94	2111
405338.48	4982486.81	218.38	405338.97	4982486.61	218.50	-0.48	0.20	-0.12	0.52	2111
405338.43	4982479.39	218.33	405338.83	4982479.14	218.41	-0.40	0.25	-0.08	0.47	2111
405338.45	4982481.84	218.35	405338.88	4982481.61	218.42	-0.43	0.23	-0.07	0.49	2111
405338.41	4982489.38	218.40	405338.29	4982488.44	218.47	0.12	0.94	-0.07	0.94	2111
405338.41	4982489.38	218.40	405339.02	4982489.12	218.45	-0.61	0.26	-0.05	0.67	2111
405339.83	4982489.50	218.40	405339.02	4982489.12	218.45	0.81	0.38	-0.05	0.89	2111
405338.43	4982479.39	218.33	405338.12	4982478.60	218.35	0.31	0.79	-0.02	0.85	2111
405338.45	4982481.84	218.35	405338.16	4982481.06	218.37	0.29	0.78	-0.02	0.84	2111
405338.43	4982484.24	218.38	405338.20	4982483.52	218.39	0.23	0.72	-0.01	0.76	2111
405338.48	4982486.81	218.38	405338.25	4982485.98	218.39	0.23	0.83	-0.01	0.86	2111
391047.53	5017371.25	300.71	391048.05	5017371.85	300.66	-0.52	-0.60	0.05	0.79	2111
391044.62	5017372.66	300.75	391045.02	5017372.38	300.70	-0.40	0.28	0.05	0.49	2111
391044.85	5017378.96	300.85	391045.42	5017379.50	300.80	-0.57	-0.54	0.05	0.78	2111
391044.82	5017382.18	300.88	391045.55	5017381.88	300.82	-0.73	0.30	0.06	0.78	2111
391045.45	5017392.18	301.00	391046.08	5017391.43	300.91	-0.64	0.75	0.09	0.98	2111
391045.27	5017389.12	300.98	391045.95	5017389.01	300.88	-0.68	0.11	0.10	0.69	2111
391048.00	5017388.63	300.94	391048.96	5017388.50	300.82	-0.96	0.13	0.12	0.97	2111
391047.71	5017379.06	300.85	391048.43	5017378.94	300.73	-0.72	0.12	0.12	0.73	2111
391044.43	5017369.90	300.69	391044.89	5017370.01	300.56	-0.46	-0.11	0.13	0.48	2111
405023.41	4953687.58	198.84	405024.34	4953687.64	198.97	-0.93	-0.06	-0.13	0.93	3111
405010.86	4953687.63	198.84	405010.49	4953687.88	198.97	0.38	-0.25	-0.13	0.45	3111
405034.97	4953687.35	198.85	405034.16	4953687.08	198.97	0.81	0.27	-0.12	0.85	3111
405027.37	4953687.50	198.85	405027.53	4953687.04	198.97	-0.16	0.46	-0.12	0.49	3111
405019.25	4953687.69	198.84	405019.45	4953687.03	198.96	-0.20	0.66	-0.12	0.69	3111
405010.86	4953687.63	198.84	405011.17	4953687.91	198.96	-0.30	-0.28	-0.12	0.42	3111
405023.41	4953687.58	198.84	405022.74	4953686.91	198.95	0.67	0.67	-0.11	0.95	3111
427187.54	4960725.96	146.09	427187.53	4960725.36	146.20	0.01	0.60	-0.11	0.60	3111
427187.68	4960720.16	146.12	427187.58	4960720.07	146.23	0.10	0.09	-0.11	0.13	3111
405114.16	4982478.16	213.32	405114.20	4982478.41	213.42	-0.04	-0.25	-0.10	0.26	3111

417196.53	4977935.26	180.59	417197.15	4977934.97	180.69	-0.62	0.29	-0.10	0.69	3111
405034.97	4953687.35	198.85	405034.93	4953687.69	198.95	0.04	-0.34	-0.10	0.34	3111
405023.41	4953687.58	198.84	405023.45	4953688.31	198.94	-0.04	-0.73	-0.10	0.73	3111
427187.97	4960712.26	146.15	427187.64	4960712.14	146.25	0.33	0.12	-0.10	0.35	3111
405038.28	4953687.26	198.85	405037.61	4953687.68	198.94	0.67	-0.42	-0.09	0.79	3111
405014.96	4953687.67	198.84	405014.43	4953688.42	198.93	0.53	-0.75	-0.09	0.92	3111
405010.86	4953687.63	198.84	405010.96	4953687.77	198.93	-0.10	-0.14	-0.09	0.17	3111
405010.86	4953687.63	198.84	405010.29	4953688.24	198.93	0.58	-0.61	-0.09	0.84	3111
427187.21	4960733.73	146.05	427187.47	4960733.32	146.14	-0.26	0.41	-0.09	0.49	3111
427187.59	4960723.53	146.11	427187.56	4960722.70	146.20	0.03	0.83	-0.09	0.83	3111
417196.34	4977933.17	180.55	417196.63	4977933.01	180.63	-0.29	0.16	-0.08	0.33	3111
405006.34	4953687.72	198.83	405007.01	4953687.94	198.91	-0.67	-0.22	-0.08	0.70	3111
417196.72	4977937.79	180.60	417197.14	4977937.19	180.67	-0.42	0.60	-0.07	0.73	3111
405042.09	4953687.25	198.86	405042.96	4953687.06	198.93	-0.87	0.19	-0.07	0.89	3111
405031.30	4953687.44	198.85	405031.40	4953686.66	198.92	-0.10	0.78	-0.07	0.79	3111
405019.25	4953687.69	198.84	405020.09	4953687.33	198.91	-0.84	0.36	-0.07	0.91	3111
417230.13	4977934.18	181.19	417230.73	4977934.37	181.24	-0.60	-0.19	-0.06	0.63	3111
417213.28	4977934.65	180.90	417213.28	4977935.08	180.96	0.00	-0.43	-0.06	0.43	3111
417213.28	4977934.65	180.90	417212.70	4977935.18	180.96	0.58	-0.53	-0.06	0.79	3111
417196.53	4977935.26	180.59	417196.22	4977936.17	180.65	0.31	-0.91	-0.06	0.96	3111
417196.53	4977935.26	180.59	417196.80	4977934.92	180.65	-0.27	0.34	-0.06	0.44	3111
417196.34	4977933.17	180.55	417195.88	4977932.39	180.61	0.46	0.78	-0.06	0.90	3111
405006.34	4953687.72	198.83	405005.39	4953687.50	198.89	0.95	0.22	-0.06	0.98	3111
417200.65	4977935.08	180.66	417200.81	4977934.97	180.71	-0.16	0.11	-0.05	0.19	3111
417196.72	4977937.79	180.60	417196.38	4977938.08	180.65	0.34	-0.29	-0.05	0.45	3111
417196.72	4977937.79	180.60	417196.99	4977936.86	180.65	-0.27	0.93	-0.05	0.97	3111
417222.96	4977934.32	181.09	417222.97	4977935.23	181.12	-0.01	-0.91	-0.03	0.91	3111
417218.74	4977934.50	181.01	417218.18	4977934.94	181.04	0.56	-0.44	-0.03	0.71	3111
417200.65	4977935.08	180.66	417201.51	4977935.51	180.69	-0.86	-0.43	-0.03	0.97	3111
390894.03	4987008.84	215.58	390894.51	4987009.49	215.60	-0.48	-0.65	-0.02	0.81	3111
390912.85	4987008.38	215.56	390912.86	4987007.51	215.58	-0.01	0.87	-0.02	0.87	3111
405109.72	4982478.31	213.31	405109.72	4982478.80	213.33	0.00	-0.49	-0.02	0.49	3111
417227.01	4977934.23	181.14	417227.67	4977934.91	181.16	-0.66	-0.68	-0.02	0.94	3111
390897.83	4987008.83	215.58	390898.10	4987009.60	215.59	-0.27	-0.77	-0.01	0.82	3111
390905.21	4987008.54	215.56	390905.83	4987008.76	215.57	-0.62	-0.22	-0.01	0.66	3111
405118.94	4982477.93	213.35	405118.13	4982477.88	213.36	0.81	0.05	-0.01	0.81	3111
417196.53	4977935.26	180.59	417196.10	4977934.92	180.60	0.43	0.34	-0.01	0.55	3111
405139.05	4982477.12	213.35	405138.45	4982477.30	213.35	0.60	-0.18	0.00	0.62	3111
405131.82	4982477.39	213.37	405131.08	4982477.26	213.37	0.74	0.13	0.00	0.75	3111
417222.96	4977934.32	181.09	417222.01	4977934.44	181.09	0.95	-0.12	0.00	0.96	3111
417222.96	4977934.32	181.09	417223.35	4977933.79	181.09	-0.39	0.53	0.00	0.66	3111
417207.48	4977934.87	180.79	417206.93	4977934.05	180.79	0.55	0.82	0.00	0.99	3111
390902.02	4987008.66	215.57	390902.13	4987009.16	215.56	-0.11	-0.50	0.01	0.51	3111
390902.02	4987008.66	215.57	390902.08	4987008.33	215.56	-0.06	0.33	0.01	0.34	3111
390902.02	4987008.66	215.57	390902.09	4987009.37	215.56	-0.07	-0.71	0.01	0.71	3111
390905.21	4987008.54	215.56	390905.07	4987009.09	215.55	0.14	-0.55	0.01	0.57	3111
417196.72	4977937.79	180.60	417196.09	4977937.17	180.59	0.63	0.63	0.01	0.89	3111
417196.34	4977933.17	180.55	417197.17	4977932.77	180.53	-0.83	0.40	0.02	0.92	3111
417196.34	4977933.17	180.55	417196.11	4977932.66	180.53	0.23	0.51	0.02	0.56	3111

390890.78	4987009.21	215.63	390890.76	4987008.37	215.59	0.02	0.84	0.03	0.85	3111
390924.27	4987007.98	215.58	390925.05	4987007.91	215.55	-0.78	0.07	0.03	0.79	3111
417222.96	4977934.32	181.09	417222.40	4977934.67	181.06	0.56	-0.35	0.03	0.66	3111
390902.02	4987008.66	215.57	390901.79	4987007.94	215.53	0.23	0.72	0.04	0.75	3111
417227.01	4977934.23	181.14	417226.49	4977933.67	181.10	0.52	0.56	0.04	0.77	3111
390902.02	4987008.66	215.57	390902.17	4987007.79	215.52	-0.15	0.87	0.05	0.88	3111
417207.48	4977934.87	180.79	417208.00	4977934.54	180.73	-0.52	0.33	0.06	0.62	3111
417200.65	4977935.08	180.66	417200.22	4977935.03	180.60	0.43	0.05	0.06	0.43	3111
390894.03	4987008.84	215.58	390893.11	4987008.63	215.51	0.92	0.21	0.07	0.95	3111
390894.03	4987008.84	215.58	390894.54	4987008.87	215.51	-0.51	-0.03	0.07	0.51	3111
390894.03	4987008.84	215.58	390893.52	4987008.50	215.50	0.51	0.34	0.08	0.61	3111
390902.02	4987008.66	215.57	390902.95	4987008.74	215.49	-0.93	-0.08	0.08	0.94	3111
390890.78	4987009.21	215.63	390891.45	4987008.57	215.52	-0.67	0.64	0.10	0.93	3111
375608.63	5020456.89	378.30	375608.43	5020456.14	378.19	0.20	0.75	0.11	0.77	3111
384031.46	5004711.73	261.03	384030.94	5004711.87	260.91	0.52	-0.14	0.12	0.53	3111
375608.56	5020459.97	378.26	375609.46	5020459.85	378.13	-0.90	0.12	0.13	0.91	3111
375608.34	5020465.61	378.23	375609.08	5020465.82	378.09	-0.74	-0.21	0.14	0.77	3111
375608.56	5020459.97	378.26	375608.69	5020460.04	378.11	-0.13	-0.07	0.14	0.15	3111
375608.64	5020453.75	378.32	375608.29	5020454.18	378.18	0.35	-0.43	0.14	0.56	3111
375608.64	5020453.75	378.32	375609.09	5020454.01	378.18	-0.45	-0.26	0.14	0.52	3111
375608.71	5020450.53	378.33	375608.83	5020450.08	378.18	-0.12	0.45	0.15	0.46	3111
384018.68	5004722.53	261.10	384018.76	5004722.73	260.94	-0.08	-0.20	0.16	0.22	3111
384020.51	5004720.96	261.08	384021.33	5004720.47	260.92	-0.82	0.49	0.16	0.95	3111
384026.60	5004715.75	261.04	384027.31	5004716.20	260.87	-0.71	-0.46	0.17	0.84	3111
384038.01	5004706.10	261.06	384038.74	5004706.06	260.88	-0.73	0.04	0.18	0.74	3111
387210.16	4974199.82	208.89	387209.82	4974200.14	208.71	0.34	-0.32	0.18	0.46	3111
375608.74	5020447.45	378.34	375608.70	5020448.11	378.15	0.04	-0.66	0.19	0.67	3111
384026.60	5004715.75	261.04	384026.15	5004716.05	260.85	0.45	-0.30	0.19	0.55	3111
384028.98	5004713.77	261.03	384028.53	5004714.43	260.84	0.45	-0.66	0.19	0.80	3111
387209.98	4974190.38	208.96	387209.91	4974189.72	208.77	0.07	0.67	0.19	0.67	3111
417234.71	4978184.59	180.03	417235.00	4978183.64	180.16	-0.29	0.95	-0.13	1.00	6111
417234.63	4978153.49	180.26	417235.15	4978154.21	180.39	-0.52	-0.72	-0.13	0.89	6111
417234.78	4978168.74	180.15	417235.07	4978169.24	180.28	-0.29	-0.50	-0.13	0.58	6111
427201.64	4960649.53	145.98	427201.42	4960648.77	146.11	0.22	0.76	-0.13	0.79	6111
427203.77	4960624.57	145.74	427202.97	4960624.18	145.87	0.80	0.39	-0.13	0.89	6111
387194.94	4974270.99	208.16	387195.77	4974271.46	208.28	-0.83	-0.47	-0.12	0.95	6111
387174.59	4974272.61	208.32	387174.72	4974272.37	208.44	-0.13	0.24	-0.12	0.28	6111
405321.77	4982502.58	218.13	405321.47	4982501.68	218.25	0.30	0.90	-0.12	0.95	6111
417234.63	4978153.49	180.26	417235.38	4978153.75	180.38	-0.75	-0.26	-0.12	0.79	6111
417234.86	4978165.29	180.15	417235.27	4978165.66	180.27	-0.41	-0.37	-0.12	0.55	6111
417234.86	4978165.29	180.15	417235.09	4978166.04	180.27	-0.23	-0.75	-0.12	0.78	6111
417234.86	4978165.29	180.15	417235.09	4978165.21	180.27	-0.23	0.08	-0.12	0.25	6111
417235.21	4978171.95	180.16	417235.23	4978171.14	180.28	-0.02	0.81	-0.12	0.81	6111
417235.35	4978174.99	180.15	417235.20	4978174.70	180.27	0.15	0.29	-0.12	0.32	6111
417235.35	4978174.99	180.15	417235.05	4978174.33	180.27	0.30	0.66	-0.12	0.72	6111
427202.35	4960643.54	145.88	427202.81	4960644.33	146.00	-0.46	-0.79	-0.12	0.91	6111
417234.68	4978181.18	180.08	417235.02	4978180.56	180.19	-0.34	0.62	-0.11	0.71	6111
417234.71	4978184.59	180.03	417234.32	4978185.16	180.14	0.39	-0.57	-0.11	0.69	6111
417234.71	4978184.59	180.03	417235.11	4978183.90	180.14	-0.40	0.69	-0.11	0.80	6111

417234.71	4978184.59	180.03	417235.00	4978184.11	180.14	-0.29	0.48	-0.11	0.57	6111
417234.86	4978165.29	180.15	417235.10	4978164.37	180.26	-0.24	0.92	-0.11	0.95	6111
417234.78	4978168.74	180.15	417235.07	4978168.46	180.26	-0.29	0.28	-0.11	0.40	6111
417235.21	4978171.95	180.16	417235.23	4978171.88	180.27	-0.02	0.07	-0.11	0.07	6111
417235.35	4978174.99	180.15	417235.20	4978174.03	180.26	0.15	0.96	-0.11	0.97	6111
427201.99	4960646.71	145.94	427202.79	4960646.88	146.05	-0.80	-0.17	-0.11	0.82	6111
387182.67	4974264.72	208.36	387182.86	4974265.69	208.46	-0.19	-0.97	-0.10	0.99	6111
417235.18	4978178.43	180.12	417235.03	4978177.61	180.22	0.15	0.82	-0.10	0.83	6111
417234.68	4978181.18	180.08	417235.14	4978180.86	180.18	-0.46	0.32	-0.10	0.56	6111
417234.68	4978181.18	180.08	417235.02	4978181.64	180.18	-0.34	-0.46	-0.10	0.57	6111
417234.68	4978181.18	180.08	417235.02	4978181.09	180.18	-0.34	0.09	-0.10	0.35	6111
417234.71	4978184.59	180.03	417235.00	4978185.02	180.13	-0.29	-0.43	-0.10	0.52	6111
417234.71	4978184.59	180.03	417235.00	4978184.56	180.13	-0.29	0.03	-0.10	0.30	6111
417234.62	4978156.29	180.22	417235.14	4978156.19	180.32	-0.52	0.10	-0.10	0.53	6111
417234.84	4978162.28	180.19	417235.30	4978163.09	180.29	-0.46	-0.81	-0.10	0.93	6111
417234.84	4978162.28	180.19	417235.11	4978161.74	180.29	-0.27	0.54	-0.10	0.60	6111
417234.86	4978165.29	180.15	417235.28	4978164.82	180.25	-0.42	0.47	-0.10	0.64	6111
417234.78	4978168.74	180.15	417235.26	4978168.10	180.25	-0.48	0.64	-0.10	0.80	6111
387175.22	4974265.51	208.39	387175.75	4974265.86	208.48	-0.53	-0.35	-0.09	0.64	6111
417234.71	4978184.59	180.03	417235.10	4978184.36	180.12	-0.39	0.23	-0.09	0.46	6111
417234.92	4978188.62	180.01	417234.55	4978187.71	180.10	0.38	0.91	-0.09	0.99	6111
417234.92	4978188.62	180.01	417235.07	4978187.91	180.10	-0.15	0.71	-0.09	0.73	6111
417234.92	4978188.62	180.01	417234.99	4978188.06	180.10	-0.07	0.56	-0.09	0.57	6111
417235.08	4978195.67	179.94	417235.23	4978195.42	180.03	-0.15	0.25	-0.09	0.29	6111
417235.21	4978171.95	180.16	417234.94	4978172.66	180.25	0.27	-0.71	-0.09	0.76	6111
427203.22	4960634.03	145.89	427204.12	4960634.38	145.98	-0.90	-0.35	-0.09	0.97	6111
427203.77	4960624.57	145.74	427204.19	4960624.19	145.83	-0.42	0.38	-0.09	0.56	6111
387190.32	4974271.33	208.23	387190.51	4974272.29	208.31	-0.19	-0.96	-0.08	0.98	6111
387190.22	4974264.00	208.31	387190.02	4974263.58	208.39	0.20	0.42	-0.08	0.47	6111
417235.18	4978178.43	180.12	417235.15	4978179.15	180.20	0.03	-0.72	-0.08	0.72	6111
417234.68	4978181.18	180.08	417235.13	4978181.39	180.16	-0.45	-0.21	-0.08	0.50	6111
417234.71	4978184.59	180.03	417235.10	4978184.82	180.11	-0.39	-0.23	-0.08	0.45	6111
417234.71	4978184.59	180.03	417235.00	4978185.44	180.11	-0.29	-0.85	-0.08	0.90	6111
417234.62	4978156.29	180.22	417235.14	4978157.14	180.30	-0.52	-0.85	-0.08	0.99	6111
417234.74	4978159.05	180.21	417235.33	4978159.51	180.29	-0.59	-0.46	-0.08	0.75	6111
417234.74	4978159.05	180.21	417235.12	4978159.02	180.29	-0.38	0.03	-0.08	0.38	6111
417234.84	4978162.28	180.19	417235.30	4978162.23	180.27	-0.46	0.05	-0.08	0.46	6111
417234.84	4978162.28	180.19	417235.10	4978162.64	180.27	-0.26	-0.36	-0.08	0.44	6111
417234.86	4978165.29	180.15	417234.23	4978164.92	180.23	0.63	0.37	-0.08	0.73	6111
405321.73	4982499.18	218.16	405321.42	4982499.16	218.23	0.31	0.02	-0.07	0.31	6111
417235.18	4978178.43	180.12	417235.16	4978178.56	180.19	0.02	-0.13	-0.07	0.13	6111
417234.62	4978156.29	180.22	417235.36	4978155.75	180.29	-0.74	0.54	-0.07	0.92	6111
417234.62	4978156.29	180.22	417235.35	4978156.71	180.29	-0.73	-0.42	-0.07	0.84	6111
417234.84	4978162.28	180.19	417234.00	4978162.35	180.26	0.84	-0.07	-0.07	0.84	6111
417235.35	4978174.99	180.15	417235.04	4978175.71	180.22	0.31	-0.72	-0.07	0.79	6111
387178.81	4974272.33	208.35	387178.89	4974271.92	208.41	-0.08	0.41	-0.06	0.42	6111
387186.01	4974271.69	208.32	387186.02	4974270.87	208.38	-0.01	0.82	-0.06	0.82	6111
387171.11	4974272.86	208.32	387171.50	4974272.43	208.37	-0.39	0.43	-0.06	0.58	6111
405321.99	4982506.30	218.19	405321.56	4982506.73	218.25	0.43	-0.43	-0.06	0.61	6111

417234.68	4978181.18	180.08	417235.13	4978181.93	180.14	-0.45	-0.75	-0.06	0.87	6111
417234.87	4978192.47	179.98	417235.00	4978191.93	180.04	-0.13	0.54	-0.06	0.56	6111
417235.35	4978174.99	180.15	417235.18	4978175.39	180.21	0.17	-0.40	-0.06	0.44	6111
427202.91	4960637.13	145.87	427202.87	4960636.72	145.93	0.04	0.41	-0.06	0.41	6111
390900.15	4986997.19	215.23	390899.70	4986996.66	215.28	0.45	0.53	-0.05	0.70	6111
417234.87	4978192.47	179.98	417235.01	4978191.75	180.03	-0.14	0.72	-0.05	0.74	6111
417234.87	4978192.47	179.98	417235.01	4978191.97	180.03	-0.14	0.50	-0.05	0.52	6111
417234.87	4978192.47	179.98	417234.99	4978191.69	180.03	-0.12	0.78	-0.05	0.79	6111
417234.87	4978192.47	179.98	417234.99	4978191.58	180.03	-0.12	0.89	-0.05	0.90	6111
417234.74	4978159.05	180.21	417235.12	4978159.96	180.26	-0.38	-0.91	-0.05	0.99	6111
417235.35	4978174.99	180.15	417235.17	4978175.22	180.20	0.18	-0.23	-0.05	0.30	6111
390898.24	4986971.28	214.79	390897.53	4986971.16	214.83	0.71	0.12	-0.04	0.72	6111
390898.24	4986971.28	214.79	390898.34	4986970.92	214.83	-0.10	0.36	-0.04	0.37	6111
417234.92	4978188.62	180.01	417235.06	4978188.59	180.05	-0.14	0.03	-0.04	0.14	6111
417234.92	4978188.62	180.01	417234.99	4978188.41	180.05	-0.07	0.21	-0.04	0.22	6111
417234.87	4978192.47	179.98	417235.02	4978191.53	180.02	-0.15	0.94	-0.04	0.96	6111
417234.87	4978192.47	179.98	417235.01	4978192.01	180.02	-0.14	0.46	-0.04	0.48	6111
417234.87	4978192.47	179.98	417235.00	4978192.04	180.02	-0.13	0.43	-0.04	0.45	6111
417234.78	4978168.74	180.15	417235.24	4978168.91	180.19	-0.46	-0.17	-0.04	0.49	6111
417235.21	4978171.95	180.16	417235.21	4978172.64	180.20	0.00	-0.69	-0.04	0.69	6111
417235.21	4978171.95	180.16	417235.05	4978172.27	180.20	0.16	-0.32	-0.04	0.36	6111
390898.24	4986971.28	214.79	390897.91	4986970.85	214.82	0.33	0.43	-0.03	0.54	6111
390898.24	4986971.28	214.79	390898.20	4986971.19	214.82	0.04	0.09	-0.03	0.10	6111
390898.24	4986971.28	214.79	390898.14	4986971.20	214.82	0.10	0.08	-0.03	0.13	6111
390898.24	4986971.28	214.79	390898.60	4986971.19	214.82	-0.36	0.09	-0.03	0.37	6111
390898.34	4986973.96	214.88	390898.46	4986974.45	214.91	-0.12	-0.50	-0.03	0.51	6111
387178.81	4974272.33	208.35	387178.27	4974271.56	208.38	0.54	0.77	-0.03	0.94	6111
387190.32	4974271.33	208.23	387189.95	4974271.18	208.26	0.37	0.15	-0.03	0.40	6111
417235.18	4978178.43	180.12	417235.41	4978177.79	180.15	-0.23	0.64	-0.03	0.68	6111
417234.87	4978192.47	179.98	417235.01	4978191.65	180.01	-0.14	0.82	-0.03	0.84	6111
390898.24	4986971.28	214.79	390898.88	4986971.83	214.81	-0.64	-0.55	-0.02	0.85	6111
390898.24	4986971.28	214.79	390898.95	4986971.27	214.81	-0.71	0.01	-0.02	0.71	6111
390898.67	4986976.43	214.90	390897.75	4986976.53	214.92	0.92	-0.10	-0.02	0.93	6111
390898.67	4986976.43	214.90	390899.49	4986976.73	214.92	-0.82	-0.30	-0.02	0.87	6111
390900.15	4986997.19	215.23	390900.10	4986996.23	215.25	0.05	0.96	-0.02	0.96	6111
387179.05	4974265.14	208.35	387178.95	4974264.41	208.37	0.10	0.73	-0.02	0.73	6111
417234.71	4978184.59	180.03	417235.10	4978185.29	180.05	-0.39	-0.70	-0.02	0.80	6111
417234.92	4978188.62	180.01	417234.98	4978189.56	180.03	-0.05	-0.94	-0.02	0.94	6111
390899.02	4986981.42	215.01	390898.67	4986982.10	215.02	0.35	-0.68	-0.01	0.76	6111
387175.22	4974265.51	208.39	387174.78	4974264.85	208.40	0.43	0.66	-0.01	0.79	6111
405321.81	4982493.72	218.11	405321.32	4982494.15	218.12	0.49	-0.43	-0.01	0.65	6111
417234.65	4978150.73	180.30	417235.40	4978150.73	180.31	-0.75	0.00	-0.01	0.75	6111
417234.87	4978192.47	179.98	417235.00	4978192.84	179.99	-0.13	-0.37	-0.01	0.39	6111
390898.67	4986976.43	214.90	390898.04	4986977.12	214.90	0.63	-0.69	0.00	0.93	6111
390898.67	4986976.43	214.90	390898.11	4986976.59	214.90	0.56	-0.16	0.00	0.58	6111
390898.67	4986976.43	214.90	390898.49	4986976.47	214.90	0.18	-0.04	0.00	0.19	6111
390898.80	4986978.94	214.95	390898.23	4986979.15	214.95	0.57	-0.21	0.00	0.61	6111
390898.80	4986978.94	214.95	390898.08	4986979.13	214.95	0.72	-0.19	0.00	0.74	6111
390899.26	4986984.49	215.06	390899.09	4986985.04	215.06	0.17	-0.55	0.00	0.58	6111

390899.50	4986987.39	215.11	390899.95	4986987.59	215.11	-0.45	-0.20	0.00	0.49	6111
390899.92	4986993.53	215.14	390899.14	4986992.95	215.14	0.78	0.58	0.00	0.97	6111
405321.45	4982490.67	218.11	405321.28	4982491.64	218.11	0.17	-0.97	0.00	0.98	6111
417234.92	4978188.62	180.01	417235.06	4978188.88	180.01	-0.14	-0.26	0.00	0.29	6111
375642.94	5020372.87	376.27	375643.33	5020372.85	376.26	-0.39	0.02	0.01	0.39	6111
390898.80	4986978.94	214.95	390899.09	4986979.41	214.94	-0.29	-0.47	0.01	0.55	6111
390899.26	4986984.49	215.06	390899.67	4986984.74	215.05	-0.41	-0.25	0.01	0.48	6111
387190.22	4974264.00	208.31	387190.58	4974264.81	208.30	-0.36	-0.81	0.01	0.88	6111
405321.98	4982496.36	218.15	405321.37	4982496.66	218.14	0.61	-0.30	0.01	0.68	6111
405322.28	4982514.61	218.35	405321.71	4982514.31	218.34	0.57	0.30	0.01	0.64	6111
375643.03	5020369.86	376.23	375643.20	5020370.69	376.21	-0.17	-0.83	0.02	0.84	6111
390898.34	4986973.96	214.88	390898.53	4986973.95	214.86	-0.19	0.00	0.02	0.19	6111
390898.80	4986978.94	214.95	390898.89	4986978.29	214.93	-0.09	0.65	0.02	0.66	6111
417234.92	4978188.62	180.01	417234.99	4978188.73	179.99	-0.07	-0.11	0.02	0.13	6111
390898.34	4986973.96	214.88	390899.05	4986973.82	214.85	-0.71	0.13	0.03	0.73	6111
390899.50	4986987.39	215.11	390899.28	4986987.41	215.08	0.22	-0.02	0.03	0.22	6111
390899.92	4986993.53	215.14	390900.50	4986993.56	215.11	-0.58	-0.03	0.03	0.58	6111
390899.02	4986981.42	215.01	390898.48	4986980.95	214.97	0.54	0.47	0.04	0.71	6111
390899.85	4986990.37	215.14	390899.50	4986989.69	215.10	0.35	0.68	0.04	0.77	6111
390899.85	4986990.37	215.14	390899.54	4986990.27	215.10	0.31	0.10	0.04	0.33	6111
390899.92	4986993.53	215.14	390900.10	4986993.99	215.10	-0.18	-0.46	0.04	0.49	6111
390899.50	4986987.39	215.11	390899.90	4986987.05	215.06	-0.40	0.34	0.05	0.52	6111
375643.03	5020363.89	376.14	375642.80	5020364.16	376.08	0.23	-0.27	0.06	0.36	6111
375643.10	5020345.03	375.92	375642.57	5020345.73	375.84	0.53	-0.70	0.08	0.88	6111
375642.99	5020360.99	376.11	375643.51	5020361.31	376.03	-0.52	-0.32	0.08	0.61	6111
375643.09	5020354.74	376.01	375643.11	5020354.66	375.93	-0.02	0.08	0.08	0.08	6111
375643.02	5020348.28	375.94	375642.71	5020347.98	375.86	0.31	0.30	0.08	0.43	6111
384017.41	5004744.34	261.21	384017.58	5004744.39	261.12	-0.17	-0.05	0.09	0.18	6111
375643.03	5020357.92	376.04	375642.39	5020357.54	375.93	0.64	0.38	0.11	0.74	6111
390898.34	4986973.96	214.88	390897.72	4986973.85	214.77	0.62	0.11	0.11	0.63	6111
427197.82	4960749.11	145.59	427197.72	4960749.05	145.71	0.10	0.06	-0.12	0.12	C111
417214.84	4977972.28	181.22	417214.62	4977972.30	181.33	0.22	-0.02	-0.11	0.22	C111
417215.03	4977975.45	181.18	417215.04	4977976.16	181.28	-0.01	-0.71	-0.10	0.71	C111
417214.29	4977963.39	181.16	417214.66	4977962.98	181.26	-0.37	0.41	-0.10	0.55	C111
417219.56	4977971.29	181.11	417219.77	4977971.92	181.20	-0.21	-0.63	-0.09	0.66	C111
417215.09	4977978.06	181.20	417214.58	4977978.66	181.29	0.51	-0.60	-0.09	0.79	C111
427199.94	4960749.56	145.53	427200.80	4960749.37	145.62	-0.86	0.19	-0.09	0.89	C111
417219.82	4977967.39	181.12	417220.01	4977968.10	181.19	-0.19	-0.71	-0.07	0.74	C111
417219.55	4977975.87	181.14	417219.74	4977976.18	181.21	-0.19	-0.31	-0.07	0.36	C111
417219.49	4977978.19	181.17	417219.74	4977978.29	181.24	-0.25	-0.10	-0.07	0.27	C111
417214.56	4977966.77	181.18	417214.65	4977965.88	181.25	-0.09	0.89	-0.07	0.89	C111
417219.82	4977967.39	181.12	417219.79	4977967.63	181.18	0.03	-0.24	-0.06	0.24	C111
417219.62	4977969.55	181.15	417220.19	4977970.14	181.21	-0.57	-0.59	-0.06	0.82	C111
417219.58	4977973.31	181.15	417219.76	4977974.06	181.21	-0.18	-0.75	-0.06	0.77	C111
417214.84	4977972.28	181.22	417215.07	4977971.94	181.28	-0.23	0.34	-0.06	0.41	C111
417214.63	4977969.72	181.22	417215.19	4977969.08	181.28	-0.56	0.64	-0.06	0.85	C111
417214.29	4977963.39	181.16	417214.66	4977963.76	181.22	-0.37	-0.37	-0.06	0.52	C111
417219.82	4977967.39	181.12	417220.79	4977967.21	181.17	-0.97	0.18	-0.05	0.98	C111
417219.50	4977980.92	181.19	417219.72	4977980.39	181.24	-0.22	0.53	-0.05	0.57	C111

417215.03	4977975.45	181.18	417215.74	4977975.18	181.23	-0.71	0.27	-0.05	0.76	C111
417214.63	4977969.72	181.22	417214.62	4977970.17	181.27	0.01	-0.45	-0.05	0.45	C111
417214.29	4977963.39	181.16	417215.13	4977963.45	181.20	-0.84	-0.06	-0.04	0.84	C111
427211.30	4960744.83	145.21	427211.65	4960744.89	145.25	-0.35	-0.06	-0.04	0.35	C111
427199.94	4960749.56	145.53	427199.20	4960749.84	145.57	0.73	-0.28	-0.04	0.79	C111
427209.04	4960750.62	145.36	427209.59	4960751.05	145.40	-0.55	-0.43	-0.04	0.70	C111
417219.62	4977969.55	181.15	417219.78	4977969.81	181.18	-0.16	-0.26	-0.03	0.30	C111
417215.30	4977980.40	181.23	417215.01	4977980.35	181.24	0.29	0.05	-0.01	0.30	C111
417214.56	4977966.77	181.18	417215.02	4977967.00	181.19	-0.46	-0.23	-0.01	0.51	C111
427211.06	4960750.97	145.31	427211.60	4960750.28	145.31	-0.54	0.69	0.00	0.88	C111
427209.04	4960750.62	145.36	427208.64	4960749.72	145.35	0.40	0.90	0.01	0.99	C111
417215.09	4977978.06	181.20	417215.03	4977978.27	181.18	0.06	-0.21	0.02	0.22	C111
427213.51	4960751.63	145.30	427213.07	4960751.47	145.28	0.43	0.16	0.02	0.46	C111
427212.24	4960751.25	145.31	427213.07	4960751.47	145.28	-0.83	-0.22	0.03	0.86	C111

CONTROL MARK DATA SHEETS

QM0775 *****
 QM0775 CBN - This is a Cooperative Base Network Control Station.
 QM0775 DESIGNATION - WABENO GPS
 QM0775 PID - QM0775
 QM0775 STATE/COUNTY- WI/FOREST
 QM0775 USGS QUAD - WABENO (1972)
 QM0775
 QM0775 *CURRENT SURVEY CONTROL
 QM0775
 QM0775* NAD 83(1997)- 45 28 20.86130(N) 088 40 32.53055(W) ADJUSTED
 QM0775* NAVD 88 - 485.5 (meters) 1593. (feet) GPS OBS
 QM0775
 QM0775 X - 103,553.033 (meters) COMP
 QM0775 Y - -4,479,429.350 (meters) COMP
 QM0775 Z - 4,524,645.133 (meters) COMP
 QM0775 LAPLACE CORR- -5.04 (seconds) DEFLEC99
 QM0775 ELLIP HEIGHT- 451.25 (meters) (04/28/99) GPS OBS
 QM0775 GEOID HEIGHT- -34.24 (meters) GEOID03
 QM0775
 QM0775 HORZ ORDER - A
 QM0775 ELLP ORDER - THIRD CLASS I
 QM0775
 QM0775.The horizontal coordinates were established by GPS observations
 QM0775.and adjusted by the National Geodetic Survey in April 1999.
 QM0775
 QM0775.The orthometric height was determined by GPS observations and a
 QM0775.high-resolution geoid model.
 QM0775
 QM0775.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 QM0775
 QM0775.The Laplace correction was computed from DEFLEC99 derived deflections.
 QM0775
 QM0775.The ellipsoidal height was determined by GPS observations
 QM0775.and is referenced to NAD 83.
 QM0775
 QM0775.The geoid height was determined by GEOID03.
 QM0775
 QM0775; North East Units Scale Factor Converg.
 QM0775;SPC WI N - 34,850.602 703,552.051 MT 1.00001843 +0 57 19.1
 QM0775;UTM 16 - 5,036,802.747 369,019.166 MT 0.99981093 -1 11 41.3
 QM0775
 QM0775! - Elev Factor x Scale Factor = Combined Factor
 QM0775!SPC WI N - 0.99992926 x 1.00001843 = 0.99994769
 QM0775!UTM 16 - 0.99992926 x 0.99981093 = 0.99974020
 QM0775
 QM0775 SUPERSEDED SURVEY CONTROL
 QM0775
 QM0775 NAD 83(1991)- 45 28 20.86130(N) 088 40 32.52921(W) AD() B
 QM0775 ELLIP H (06/11/91) 451.22 (m) GP() 4 1
 QM0775 NGVD 29 (10/12/93) 485.5 (m) 1593. (f) GPS OBS
 QM0775
 QM0775.Superseded values are not recommended for survey control.
 QM0775.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 QM0775.See file dsdata.txt to determine how the superseded data were derived.
 QM0775
 QM0775_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TCR6901936803(NAD 83)

QM0775_MARKER: DH = HORIZONTAL CONTROL DISK
 QM0775_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 QM0775_SP_SET: CONCRETE POST
 QM0775_STAMPING: WABENO GPS 1989
 QM0775_MARK LOGO: NGS
 QM0775_PROJECTION: FLUSH
 QM0775_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT
 QM0775_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 QM0775+STABILITY: SURFACE MOTION
 QM0775_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 QM0775+SATELLITE: SATELLITE OBSERVATIONS - March 25, 2004

QM0775
 QM0775 HISTORY - Date Condition Report By
 QM0775 HISTORY - 1989 MONUMENTED WIHD
 QM0775 HISTORY - 19900720 GOOD
 QM0775 HISTORY - 19910611 GOOD USFS
 QM0775 HISTORY - 19970929 GOOD WIHD
 QM0775 HISTORY - 20021210 GOOD USPSQD
 QM0775 HISTORY - 20040325 GOOD USPSQD

QM0775
 QM0775 STATION DESCRIPTION

QM0775 DESCRIBED BY WI HIGHWAY DEPT 1989
 QM0775 THE STATION IS LOCATED ABOUT 10.49 KM (6.50 MI) SOUTH OF LAONA, 2.58
 QM0775 KM (1.60 MI) NORTH OF WABENO, 8.23 KM (5.10 MI) WEST OF BLACKWELL.
 QM0775 OWNERSHIP--STATE HIGHWAY R.O.W.
 QM0775 TO REACH FROM THE INTERSECTION OF U.S. HIGHWAY 8 AND STATE HIGHWAY 32
 QM0775 IN LAONA, GO SOUTH FOR 10.4 KM (6.45 MI) ON STATE HIGHWAY 32 TO THE
 QM0775 STATION ON THE RIGHT.
 QM0775 STATION IS A STANDARD NGS HORIZONTAL CONTROL DISK STAMPED --WABENO GPS
 QM0775 1989--, SET INTO THE TOP OF A 40 CM DIAMETER CONCRETE MONUMENT SET
 QM0775 FLUSH WITH THE GROUND. LOCATED 0.91 M (3.0 FT) EAST OF A CARSONITE
 QM0775 WITNESS POST, 19.51 M (64.0 FT) WEST OF THE CENTER-LINE OF STATE
 QM0775 HIGHWAY 32, 76.2 M (250.0 FT) NORTH FROM THE CENTER-LINE OF BREEDEN
 QM0775 LANE.

QM0775
 QM0775 STATION RECOVERY (1990)

QM0775
 QM0775 RECOVERED 1990
 QM0775 RECOVERED IN GOOD CONDITION.

QM0775
 QM0775 STATION RECOVERY (1991)

QM0775
 QM0775 RECOVERY NOTE BY US FOREST SERVICE 1991
 QM0775 DESCRIBED BY WI DEPT OF TRANSP 1989
 QM0775 THE STATION IS LOCATED ABOUT 10.49 KM (6.50 MI) SOUTH OF LAONA, 2.58
 QM0775 KM (1.60 MI) NORTH OF WABENO, 8.23 KM (5.10 MI) 95.10 MI) WEST OF
 QM0775 BLACKWELL.
 QM0775 OWNERSHIP--STATE HIGHWAY R.O.W.
 QM0775 TO REACH FROM THE INTERSECTION OF U.S. HIGHWAY 8 AND STATE HIGHWAY 32
 QM0775 IN LAONA, GO SOUTH FOR 10.4 KM (6.45 MI) ON STATE HIGHWAY 32 TO THE
 QM0775 STATION ON THE RIGHT.
 QM0775 STATION IS A STANDARD NGS HORIZONTAL CONTROL DISK STAMPED--WABENO GPS
 QM0775 1989--, SET INTO THE TOP OF A 40 CM DIAMETER CONCRETE MONUMENT SET
 QM0775 FLUSH WITH THE GROUND. LOCATED 0.91 M (2.99 FT) EAST OF A CARSONITE
 QM0775 WITNESS POST, 19.51 M (64.01 FT) WEST OF THE CENTER-LINE OF STATE

QM0775'HIGHWAY 32, 76.2 M (250.0 FT) NORTH FROM THE CENTER-LINE OF BREEDEN
QM0775'LANE.

QM0775

QM0775 STATION RECOVERY (1997)

QM0775

QM0775'RECOVERY NOTE BY WI HIGHWAY DEPT 1997 (CSM)

QM0775'THE STATION IS LOCATED ABOUT 59.54 KM (37.00 MI) SOUTH-SOUTHEAST OF
QM0775'RHINELANDER, 9.66 KM (6.00 MI) SOUTH OF LAONA, AND 4.02 KM (2.50 MI)
QM0775'NORTH-NORTHWEST OF WABENO ON THE WEST RIGHT-OF-WAY OF STATE HIGHWAY
QM0775'32. OWNERSHIP--WISCONSIN DEPARTMENT OF TRANSPORTATION. TO REACH THE
QM0775'STATION FROM THE JUNCTION OF US HIGHWAY 8 WITH STATE HIGHWAY 32 ON THE
QM0775'SOUTH SIDE OF THE COMMUNITY OF LAONA, GO SOUTH 9.4 KM (5.85 MI) ON
QM0775'HIGHWAY 32 TO THE STATION ON THE RIGHT. ALTERNATELY, FROM THE
QM0775'JUNCTION OF STATE HIGHWAY 52 WITH HIGHWAY 32 ABOUT 1.62 KM (1.00 MI)
QM0775'WEST-NORTHWEST OF THE COMMUNITY OF WABENO, GO NORTH 3.1 KM (1.90 MI)
QM0775'ON HIGHWAY 32 TO THE STATION ON THE LEFT. THE STATION IS A BRONZE NGS
QM0775'HORIZONTAL CONTROL MARK DISK SET IN THE TOP OF A 40-CM (16-INCH)
QM0775'DIAMETER, 6-FOOT-DEEP CONCRETE POST FLUSH WITH THE GROUND AND ABOUT 1
QM0775'M (3.3 FT) ABOVE THE HIGHWAY. THE STATION IS 19.4 M (63.6 FT) WEST OF
QM0775'THE CENTERLINE OF HIGHWAY 32, 96.7 M (317.3 FT) NORTH OF THE
QM0775'CENTERLINE OF BREEDEN LANE, 31.9 M (104.7 FT) SOUTHWEST OF THE NORTH
QM0775'END OF A 61-CM (24-INCH) DIAMETER CORRIGATED METAL CULVERT PIPE UNDER
QM0775'A DRIVEWAY TO A METAL BARN EAST OF THE HIGHWAY, 62.8 M (206.0 FT)
QM0775'SOUTHWEST OF A 0.9 M (3.0 FT) DIAMETER HARD MAPLE TREE EAST OF THE
QM0775'HIGHWAY, 44.7 M (146.7 FT) SOUTHWEST OF A 15-CM (6-INCH) DIAMETER
QM0775'WOODEN CORNER POST AT THE SOUTHWEST CORNER OF AN ANIMAL (OSTRICH) PEN
QM0775'EAST OF THE HIGHWAY, 0.9 M (3.0 FT) EAST OF AN ORANGE FIBERGLASS
QM0775'WITNESS POST, AND 0.85 M (2.79 FT) EAST OF A WHITE PLASTIC WITNESS
QM0775'POST.

QM0775

QM0775 STATION RECOVERY (2002)

QM0775

QM0775'RECOVERY NOTE BY US POWER SQUADRON 2002 (DRB)

QM0775'RECOVERED IN GOOD CONDITION. THE STATION IS 3 FEET
QM0775'EAST OF A WHITE WITNESS POST, 3 FEET EAST OF AN
QM0775'ORANGE WITNESS POST, 3 FEET NORTHEAST OF A 3X3 INCH
QM0775'SQUARE WITNESS POST, 3 FEET SOUTHEAST OF A 3X3 INCH
QM0775'ORANGE WITNESS POST.

QM0775

QM0775 STATION RECOVERY (2004)

QM0775

QM0775'RECOVERY NOTE BY US POWER SQUADRON 2004 (CLB)

QM0775'RECOVERED IN GOOD CONDITION.

QM0573 *****
 QM0573 DESIGNATION - G 223
 QM0573 PID - QM0573
 QM0573 STATE/COUNTY- WI/OCONTO
 QM0573 USGS QUAD - MOUNTAIN (1973)
 QM0573
 QM0573 *CURRENT SURVEY CONTROL
 QM0573
 QM0573* NAD 83(1986)- 45 09 50. (N) 088 27 04. (W) SCALED
 QM0573* NAVD 88 - 285.861 (meters) 937.86 (feet) ADJUSTED
 QM0573
 QM0573 GEOID HEIGHT- -35.73 (meters) GEOID03
 QM0573 DYNAMIC HT - 285.832 (meters) 937.77 (feet) COMP
 QM0573 MODELED GRAV- 980,509.6 (mgal) NAVD 88
 QM0573
 QM0573 VERT ORDER - FIRST CLASS II
 QM0573
 QM0573.The horizontal coordinates were scaled from a topographic map and have
 QM0573.an estimated accuracy of +/- 6 seconds.
 QM0573
 QM0573.The orthometric height was determined by differential leveling
 QM0573.and adjusted by the National Geodetic Survey in June 1991.
 QM0573
 QM0573.The geoid height was determined by GEOID03.
 QM0573
 QM0573.The dynamic height is computed by dividing the NAVD 88
 QM0573.geopotential number by the normal gravity value computed on the
 QM0573.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 QM0573.degrees latitude (g = 980.6199 gals.).
 QM0573
 QM0573.The modeled gravity was interpolated from observed gravity values.
 QM0573
 QM0573; SPC WI C - North East Units Estimated Accuracy
 QM0573; SPC WI C - 149,010. 721,760. MT (+/- 180 meters Scaled)
 QM0573
 QM0573 SUPERSEDED SURVEY CONTROL
 QM0573
 QM0573.No superseded survey control is available for this station.
 QM0573
 QM0573_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TCR859021(NAD 83)
 QM0573_MARKER: I = METAL ROD
 QM0573_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

QM0573
QM0573 STATION DESCRIPTION
QM0573
QM0573'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985
QM0573'39.3 KM (24.4 MI) NW FROM GILLETT.
QM0573'39.3 KM (24.4 MI) NORTHWESTERLY ALONG STATE HIGHWAY 32 FROM ITS
QM0573'JUNCTION WITH STATE HIGHWAY 22 IN GILLETT, 41.8 M (137.1 FT) NORTHEAST
QM0573'OF THE CENTERLINE OF THE HIGHWAY, 10.0 M (32.8 FT) WEST OF THE CENTER
QM0573'OF WELLER ROAD, AND 1.2 M (3.9 FT) NORTH OF UTILITY POLE NUMBER 3116
QM0573'13L3. NOTE--ACCESS TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.
QM0573'THE MARK IS 0.3 METERS S FROM A WITNESS POST
QM0573'THE MARK IS ABOVE LEVEL WITH THE ROAD.
QM0573
QM0573 STATION RECOVERY (1991)
QM0573
QM0573'RECOVERY NOTE BY US POWER SQUADRON 1991 (AEA)
QM0573'RECOVERED IN GOOD CONDITION.
QM0573
QM0573 STATION RECOVERY (1996)
QM0573
QM0573'RECOVERY NOTE BY US POWER SQUADRON 1996
QM0573'RECOVERED IN GOOD CONDITION.
QM0573
QM0573 STATION RECOVERY (2002)
QM0573
QM0573'RECOVERY NOTE BY US POWER SQUADRON 2002 (BAA)
QM0573'MARK NOT FOUND.
QM0573
QM0573 STATION RECOVERY (2002)
QM0573
QM0573'RECOVERY NOTE BY US POWER SQUADRON 2002 (DRB)
QM0573'NOT FOUND. THE UTILITY POLE HAS BEEN MOVED BUT THE
QM0573'WITNESS POST IS PRESENT. DID NOT FIND WITH PROBING.
QM0573
QM0573 STATION RECOVERY (2004)
QM0573
QM0573'RECOVERY NOTE BY US POWER SQUADRON 2004 (CLB)
QM0573'MARK NOT FOUND.

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PN0018 *****
PN0018 DESIGNATION - GREEN
PN0018 PID - PN0018
PN0018 STATE/COUNTY- WI/SHAWANO
PN0018 USGS QUAD - KRAKOW (1974)
PN0018
PN0018 *CURRENT SURVEY CONTROL
PN0018
PN0018* NAD 83(1991)- 44 47 44.01375(N) 088 16 01.03140(W) ADJUSTED
PN0018* NAVD 88 - 244.468 (meters) 802.06 (feet) ADJUSTED
PN0018
PN0018 LAPLACE CORR- -1.04 (seconds) DEFLEC99
PN0018 GEOID HEIGHT- -36.18 (meters) GEOID03
PN0018 DYNAMIC HT - 244.439 (meters) 801.96 (feet) COMP
PN0018 MODELED GRAV- 980,492.4 (mgal) NAVD 88
PN0018
PN0018 HORZ ORDER - FIRST
PN0018 VERT ORDER - FIRST CLASS II
PN0018
PN0018.The horizontal coordinates were established by classical geodetic methods
PN0018.and adjusted by the National Geodetic Survey in November 1991.
PN0018
PN0018.The orthometric height was determined by differential leveling
PN0018.and adjusted by the National Geodetic Survey in June 1991.
PN0018
PN0018.The Laplace correction was computed from DEFLEC99 derived deflections.
PN0018
PN0018.The geoid height was determined by GEOID03.
PN0018
PN0018.The dynamic height is computed by dividing the NAVD 88
PN0018.geopotential number by the normal gravity value computed on the
PN0018.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
PN0018.degrees latitude (g = 980.6199 gals.).
PN0018
PN0018.The modeled gravity was interpolated from observed gravity values.
PN0018
PN0018; North East Units Scale Factor Converg.
PN0018;SPC WI C - 108,384.172 737,111.911 MT 0.99994169 +1 13 22.1
PN0018;UTM 16 - 4,961,020.746 399,790.176 MT 0.99972348 -0 53 33.9
PN0018
PN0018! - Elev Factor x Scale Factor = Combined Factor
PN0018!SPC WI C - 0.99996734 x 0.99994169 = 0.99990904
PN0018!UTM 16 - 0.99996734 x 0.99972348 = 0.99969083
PN0018
PN0018: Primary Azimuth Mark Grid Az
PN0018:SPC WI C - KROKAY 171 55 26.1
PN0018:UTM 16 - KROKAY 174 02 22.1
PN0018
PN0018|-----|
PN0018| PID Reference Object Distance Geod. Az |
PN0018| dddmmss.s |
PN0018| PN0019 KROKAY APPROX. 6.5 KM 1730848.2 |
PN0018| CJ5026 GREEN RM 19.600 METERS 21034 |
PN0018|-----|
PN0018
PN0018 SUPERSEDED SURVEY CONTROL

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PN0018

PN0018 NAD 83(1986)- 44 47 44.05095(N) 088 16 00.98548(W) AD() 1

PN0018 NAD 27 - 44 47 44.06400(N) 088 16 00.65500(W) AD() 1

PN0018 NGVD 29 (??/??/92) 244.475 (m) 802.08 (f) ADJ UNCH 1 2

PN0018

PN0018.Superseded values are not recommended for survey control.

PN0018.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

PN0018.See file dsdata.txt to determine how the superseded data were derived.

PN0018

PN0018_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TCQ9979061021(NAD 83)

PN0018_MARKER: DS = TRIANGULATION STATION DISK

PN0018_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

PN0018_SP_SET: CONCRETE POST

PN0018_STAMPING: GREEN 1921 ELEV. 802.082 FT.

PN0018_MARK LOGO: CGS

PN0018_PROJECTION: FLUSH

PN0018_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

PN0018+STABILITY: SURFACE MOTION

PN0018_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

PN0018+SATELLITE: SATELLITE OBSERVATIONS - March 25, 2004

PN0018

PN0018 HISTORY	- Date	Condition	Report By
PN0018 HISTORY	- 1921	MONUMENTED	CGS
PN0018 HISTORY	- 1921	GOOD	CGS
PN0018 HISTORY	- 1934	GOOD	NGS
PN0018 HISTORY	- 1980	GOOD	GE
PN0018 HISTORY	- 1985	GOOD	NGS
PN0018 HISTORY	- 20021115	GOOD	USPSQD
PN0018 HISTORY	- 20040325	GOOD	USPSQD

PN0018

PN0018 STATION DESCRIPTION

PN0018

PN0018'DESCRIBED BY COAST AND GEODETIC SURVEY 1921 (CLG)

PN0018'STATION IS ABOUT 120 METERS S OF THE GREEN VALLEY DEPOT, 10

PN0018'METERS S OF FIRST ROAD CROSSING S OF THE DEPOT, ON THE W SIDE

PN0018'OF THE TRACK, 25 METERS S OF SWITCH STAND AND 2.30 METERS

PN0018'(7.55 FEET) W OF THE W RAIL.

PN0018'

PN0018'STATION IS A STANDARD BRONZE DISK SET IN A LARGE CONCRETE BLOCK

PN0018'3 FEET SQUARE AND 4 FEET DEEP. REFERENCE MARK IS A STANDARD

PN0018'BRONZE DISK SET IN CONCRETE, AS DESCRIBED IN NOTE 11A.

PN0018'

PN0018'REFERENCE MARK IS ON W SIDE OF TRACK 0.25 METER E OF THE PROPERTY

PN0018'LINE FENCE.

PN0018

PN0018 STATION RECOVERY (1921)

PN0018

PN0018'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1921

PN0018'AT GREEN VALLEY.

PN0018'AT GREEN VALLEY, SHAWANO COUNTY, 130 YARDS SOUTH OF THE CHICAGO

PN0018'AND NORTH WESTERN RAILWAY STATION, 80 FEET SOUTH OF A SWITCHSTAND,

PN0018'35 FEET SOUTH OF THE CROSSING OF STATE HIGHWAY 32, AND 7.6 FEET

PN0018'WEST OF THE WEST RAIL. A STANDARD TRIANGULATION-STATION DISK,

PN0018'STAMPED ELEV. 802.082 FT. GREEN 1921 AND SET IN THE TOP OF A

PN0018'3- BY 4-FOOT CONCRETE BLOCK.

PN0018

PN0018 STATION RECOVERY (1934)
PN0018
PN0018'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1934
PN0018'RECOVERED IN GOOD CONDITION.
PN0018
PN0018 STATION RECOVERY (1980)
PN0018
PN0018'RECOVERY NOTE BY GENERAL ELECTRIC CORPORATION 1980 (FWM)
PN0018'STATION AND REFERENCES RECOVERED IN GOOD ORDER. CHURCH IN
PN0018'DESCRIPTION HAS BEEN TORN DOWN.
PN0018
PN0018 STATION RECOVERY (1985)
PN0018
PN0018'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1985
PN0018'RECOVERED IN GOOD CONDITION. A NEW DESCRIPTION FOLLOWS. IN GREEN
PN0018'VALLEY, AT THE INTERSECTION OF COUNTY HIGHWAY E AND RAILROAD AVENUE,
PN0018'55.5 M (182.1 FT) WEST OF THE EXTENDED CENTER OF CO-OP AVENUE, 37.8 M
PN0018'(124.0 FT) EAST OF THE EXTENDED CENTER OF THE AVENUE, 10.4 M (34.1 FT)
PN0018'SOUTH OF THE CENTER OF THE HIGHWAY, AND 2.4 M (7.9 FT) WEST OF THE
PN0018'CENTER OF A SNOWMOBILE TRAIL (OLD RAILROAD BED).
PN0018'THE MARK IS 0.5 METERS N FROM A WITNESS POST
PN0018'THE MARK IS 0.3 M BELOW THE HIGHWAY.
PN0018
PN0018 STATION RECOVERY (2002)
PN0018
PN0018'RECOVERY NOTE BY US POWER SQUADRON 2002 (DRB)
PN0018'RECOVERED IN GOOD CONDITION. RAILROAD AVENUE IS NOW NAMED RAIL WAY
PN0018'STREET. THE STATION IS APPROXIMATELY 30 FEET WEST AND IN LINE WITH THE
PN0018'WEST END OF A GUARD RAIL PROTECTING A 6X6X4 FOOT GREEN PUMPING STATION
PN0018'BOX.
PN0018
PN0018 STATION RECOVERY (2004)
PN0018
PN0018'RECOVERY NOTE BY US POWER SQUADRON 2004 (CLB)
PN0018'RECOVERED IN GOOD CONDITION.

QM0574 *****
 QM0574 DESIGNATION - H 223
 QM0574 PID - QM0574
 QM0574 STATE/COUNTY- WI/CONTO
 QM0574 USGS QUAD - MOUNTAIN (1973)
 QM0574
 QM0574 *CURRENT SURVEY CONTROL
 QM0574

 QM0574* NAD 83(1986)- 45 08 48. (N) 088 27 06. (W) SCALED
 QM0574* NAVD 88 - 276.941 (meters) 908.60 (feet) ADJUSTED
 QM0574

 QM0574 GEOID HEIGHT- -35.76 (meters) GEOID03
 QM0574 DYNAMIC HT - 276.913 (meters) 908.51 (feet) COMP
 QM0574 MODELED GRAV- 980,509.7 (mgal) NAVD 88
 QM0574
 QM0574 VERT ORDER - FIRST CLASS II
 QM0574
 QM0574.The horizontal coordinates were scaled from a topographic map and have
 QM0574.an estimated accuracy of +/- 6 seconds.
 QM0574
 QM0574.The orthometric height was determined by differential leveling
 QM0574.and adjusted by the National Geodetic Survey in June 1991.
 QM0574
 QM0574.The geoid height was determined by GEOID03.
 QM0574
 QM0574.The dynamic height is computed by dividing the NAVD 88
 QM0574.geopotential number by the normal gravity value computed on the
 QM0574.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 QM0574.degrees latitude (g = 980.6199 gals.).
 QM0574
 QM0574.The modeled gravity was interpolated from observed gravity values.
 QM0574

QM0574;	North	East	Units	Estimated Accuracy
QM0574;SPC WI C	- 147,100.	721,760.	MT	(+/- 180 meters Scaled)

 QM0574
 QM0574 SUPERSEDED SURVEY CONTROL
 QM0574
 QM0574.No superseded survey control is available for this station.
 QM0574
 QM0574_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TCR858002(NAD 83)
 QM0574_MARKER: I = METAL ROD
 QM0574_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

QM0574
 QM0574 STATION DESCRIPTION
 QM0574
 QM0574'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985
 QM0574'37.3 KM (23.2 MI) NW FROM GILLETT.
 QM0574'37.4 KM (23.2 MI) NORTHWESTERLY ALONG STATE HIGHWAY 32 FROM ITS
 QM0574'JUNCTION WITH STATE HIGHWAY 22 IN GILLETT, 31.7 M (104.0 FT) WEST OF
 QM0574'THE CENTERLINE OF THE HIGHWAY, 25.3 M (83.0 FT) SOUTH OF THE EXTENDED
 QM0574'CENTER OF NATIONAL FOREST ROAD 2308 (OLD 64 ROAD), AND 1.3 M (4.3 FT)
 QM0574'NORTH OF UTILITY POLE NUMBER 3116 24L29 WITH A GUY WIRE. NOTE--ACCESS
 QM0574'TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.
 QM0574'THE MARK IS 0.3 METERS S FROM A WITNESS POST
 QM0574'THE MARK IS ABOVE LEVEL WITH THE HIGHWAY.
 QM0574
 QM0574 STATION RECOVERY (1991)
 QM0574
 QM0574'RECOVERY NOTE BY US POWER SQUADRON 1991 (AEA)
 QM0574'RECOVERED IN GOOD CONDITION.
 QM0574
 QM0574 STATION RECOVERY (1996)
 QM0574
 QM0574'RECOVERY NOTE BY US POWER SQUADRON 1996
 QM0574'RECOVERED IN GOOD CONDITION.
 QM0574
 QM0574 STATION RECOVERY (2002)
 QM0574
 QM0574'RECOVERY NOTE BY US POWER SQUADRON 2002 (BAA)
 QM0574'RECOVERED IN GOOD CONDITION.
 QM0574
 QM0574 STATION RECOVERY (2002)
 QM0574
 QM0574'RECOVERY NOTE BY US POWER SQUADRON 2002 (DRB)
 QM0574'RECOVERED IN GOOD CONDITION.
 QM0574
 QM0574 STATION RECOVERY (2004)
 QM0574
 QM0574'RECOVERY NOTE BY US POWER SQUADRON 2004 (CLB)
 QM0574'RECOVERED IN GOOD CONDITION.

PN0322 *****

PN0322 DESIGNATION - L 23

PN0322 PID - PN0322

PN0322 STATE/COUNTY- WI/SHAWANO

PN0322 USGS QUAD - THORNTON (1982)

PN0322

PN0322 *CURRENT SURVEY CONTROL

PN0322

PN0322* NAD 83(1997)- 44 47 13.39821(N) 088 39 32.21922(W) ADJUSTED

PN0322* NAVD 88 - 257.681 (meters) 845.41 (feet) ADJUSTED

PN0322

PN0322 X - 106,122.483 (meters) COMP

PN0322 Y - -4,533,208.339 (meters) COMP

PN0322 Z - 4,470,740.109 (meters) COMP

PN0322 LAPLACE CORR- 0.12 (seconds) DEFLEC99

PN0322 ELLIP HEIGHT- 221.57 (meters) (08/20/99) GPS OBS

PN0322 GEOID HEIGHT- -36.09 (meters) GEOID03

PN0322 DYNAMIC HT - 257.648 (meters) 845.30 (feet) COMP

PN0322 MODELED GRAV- 980,480.6 (mgal) NAVD 88

PN0322

PN0322 HORZ ORDER - A

PN0322 VERT ORDER - SECOND CLASS 0

PN0322 ELLP ORDER - THIRD CLASS I

PN0322

PN0322.The horizontal coordinates were established by GPS observations
 PN0322.and adjusted by the National Geodetic Survey in April 1999.

PN0322

PN0322.The orthometric height was determined by differential leveling
 PN0322.and adjusted by the National Geodetic Survey in June 1991.

PN0322

PN0322.The X, Y, and Z were computed from the position and the ellipsoidal ht.

PN0322

PN0322.The Laplace correction was computed from DEFLEC99 derived deflections.

PN0322

PN0322.The ellipsoidal height was determined by GPS observations
 PN0322.and is referenced to NAD 83.

PN0322

PN0322.The geoid height was determined by GEOID03.

PN0322

PN0322.The dynamic height is computed by dividing the NAVD 88
 PN0322.geopotential number by the normal gravity value computed on the
 PN0322.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PN0322.degrees latitude (g = 980.6199 gals.).

PN0322

PN0322.The modeled gravity was interpolated from observed gravity values.

PN0322

PN0322;	North	East	Units	Scale	Factor	Converg.
PN0322;SPC WI C	- 106,852.257	706,117.504	MT	0.99994191	+0 56 46.4	
PN0322;UTM 16	- 4,960,633.968	368,765.812	MT	0.99981178	-1 10 07.9	

PN0322

PN0322! - Elev Factor x Scale Factor = Combined Factor

PN0322!SPC WI C - 0.99996526 x 0.99994191 = 0.99990717

PN0322!UTM 16 - 0.99996526 x 0.99981178 = 0.99977705

PN0322

PN0322

PN0322 SUPERSEDED SURVEY CONTROL

PN0322

PN0322 ELLIP H (04/28/99) 221.52 (m) GP() 3 1
PN0322 NAVD 88 (04/28/99) 257.68 (m) 845.4 (f) LEVELING 3
PN0322 NGVD 29 (??/??/92) 257.708 (m) 845.50 (f) ADJ UNCH 2 0
PN0322

PN0322.Superseded values are not recommended for survey control.
PN0322.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
PN0322.See file dsdata.txt to determine how the superseded data were derived.
PN0322

PN0322_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TCQ6876660634(NAD 83)
PN0322_MARKER: DB = BENCH MARK DISK
PN0322_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
PN0322_SP_SET: SET IN TOP OF CONCRETE MONUMENT
PN0322_STAMPING: L 23 1934
PN0322_MARK LOGO: CGS
PN0322_PROJECTION: FLUSH
PN0322_MAGNETIC: N = NO MAGNETIC MATERIAL
PN0322_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
PN0322+STABILITY: SURFACE MOTION
PN0322_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
PN0322+SATELLITE: SATELLITE OBSERVATIONS - June 07, 2003

PN0322
PN0322 HISTORY - Date Condition Report By
PN0322 HISTORY - UNK MONUMENTED CGS
PN0322 HISTORY - 1934 GOOD NGS
PN0322 HISTORY - 19971210 GOOD NGS
PN0322 HISTORY - 20030607 GOOD JCLS

PN0322
PN0322 STATION DESCRIPTION
PN0322
PN0322'DESCRIBED BY NATIONAL GEODETIC SURVEY 1934
PN0322'2.8 MI W FROM SHAWANO.

PN0322'ALONG CHICAGO AND NORTH-WESTERN RY., AT WISCONSIN HIGHWAY 29
PN0322'OVERPASS. MARK IS AT FENCE, 14 YDS. W. OF CENTERLINE OF TRACK,
PN0322'12 YDS. S. OF CENTERLINE OF CROSSING, 4 YDS. S. OF CORNER FENCE
PN0322'POST AND 160 YDS. S. OF OVERPASS.

PN0322
PN0322 STATION RECOVERY (1997)

PN0322
PN0322'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1997 (CSM)
PN0322'RECOVERED AS DESCRIBED.

PN0322
PN0322 STATION RECOVERY (2003)

PN0322
PN0322'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2003 (MRY)
PN0322'RECOVERED IN GOOD CONDITION.

PM0590 *****

PM0590 FBN - This is a Federal Base Network Control Station.

PM0590 PACS - This is a Primary Airport Control Station.

PM0590 DESIGNATION - OCONTO GPS

PM0590 PID - PM0590

PM0590 STATE/COUNTY- WI/OCONTO

PM0590 USGS QUAD - OCONTO WEST (1974)

PM0590

PM0590 *CURRENT SURVEY CONTROL

PM0590* NAD 83(1997)- 44 52 33.58431(N) 087 54 40.56138(W) ADJUSTED

PM0590* NAVD 88 - 183.97 (meters) 603.6 (feet) GPS OBS

PM0590 X - 165,012.088 (meters) COMP

PM0590 Y - -4,524,421.153 (meters) COMP

PM0590 Z - 4,477,697.543 (meters) COMP

PM0590 LAPLACE CORR- -1.68 (seconds) DEFLEC99

PM0590 ELLIP HEIGHT- 147.51 (meters) (04/28/99) GPS OBS

PM0590 GEOID HEIGHT- -36.46 (meters) GEOID03

PM0590

PM0590 HORZ ORDER - A

PM0590 ELLP ORDER - THIRD CLASS I

PM0590

PM0590.This mark is at Oconto Airport (OCQ)

PM0590

PM0590.The horizontal coordinates were established by GPS observations

PM0590.and adjusted by the National Geodetic Survey in April 1999.

PM0590

PM0590.The orthometric height was determined by GPS observations and a

PM0590.high-resolution geoid model.

PM0590

PM0590.GPS derived orthometric heights for airport stations designated as

PM0590.PACS or SACS are published to 2 decimal places. This maintains

PM0590.centimeter relative accuracy between the PACS and SACS. It does

PM0590.not indicate centimeter accuracy relative to other marks which are

PM0590.part of the NAVD 88 network.

PM0590

PM0590.The X, Y, and Z were computed from the position and the ellipsoidal ht.

PM0590

PM0590.The Laplace correction was computed from DEFLEC99 derived deflections.

PM0590

PM0590.The ellipsoidal height was determined by GPS observations

PM0590.and is referenced to NAD 83.

PM0590

PM0590.The geoid height was determined by GEOID03.

PM0590

PM0590;	North	East	Units	Scale	Factor	Converg.
PM0590;SPC WI C	- 117,981.644	765,016.849	MT	0.99994070	+1 28 25.5	
PM0590;UTM 16	- 4,969,579.112	428,023.448	MT	0.99966370	-0 38 34.8	

PM0590

PM0590! - Elev Factor x Scale Factor = Combined Factor

PM0590!SPC WI C - 0.99997687 x 0.99994070 = 0.99991757

PM0590!UTM 16 - 0.99997687 x 0.99966370 = 0.99964058

PM0590

PM0590:	Primary Azimuth Mark	Grid Az
PM0590:SPC WI C	- OCONTO GPS AZ MK	126 41 11.4

PM0590:UTM 16 - OCONTO GPS AZ MK 128 48 11.7

PM0590

PM0590|-----|

PM0590| PID Reference Object Distance Geod. Az |

PM0590| dddmmss.s |

PM0590| PM0592 OCONTO GPS AZ MK APPROX. 0.8 KM 1280936.9 |

PM0590|-----|

PM0590

PM0590 SUPERSEDED SURVEY CONTROL

PM0590

PM0590 NAD 83(1991)- 44 52 33.58296(N) 087 54 40.56023(W) AD() B

PM0590 ELLIP H (06/11/91) 147.62 (m) GP() 4 1

PM0590 NGVD 29 (06/11/91) 183.9 (m) 603. (f) GPS OBS

PM0590

PM0590.Superseded values are not recommended for survey control.

PM0590.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

PM0590.See file dsdata.txt to determine how the superseded data were derived.

PM0590

PM0590_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TDQ2802369579(NAD 83)

PM0590_MARKER: DH = HORIZONTAL CONTROL DISK

PM0590_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

PM0590_SP_SET: CONCRETE POST

PM0590_STAMPING: OCONTO GPS 1989

PM0590_MARK LOGO: NGS

PM0590_PROJECTION: FLUSH

PM0590_MAGNETIC: N = NO MAGNETIC MATERIAL

PM0590_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

PM0590+STABILITY: SURFACE MOTION

PM0590_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

PM0590+SATELLITE: SATELLITE OBSERVATIONS - July 09, 2003

PM0590

PM0590 HISTORY - Date Condition Report By

PM0590 HISTORY - 1989 MONUMENTED WIHD

PM0590 HISTORY - 19900731 GOOD

PM0590 HISTORY - 19900821 GOOD

PM0590 HISTORY - 19971209 GOOD NGS

PM0590 HISTORY - 20010920 GOOD JCLS

PM0590 HISTORY - 20020614 GOOD JCLS

PM0590 HISTORY - 20030709 GOOD WIDT

PM0590

PM0590 STATION DESCRIPTION

PM0590

PM0590'DESCRIBED BY WI HIGHWAY DEPT 1989

PM0590'THE STATION IS LOCATED ABOUT 2.42 KM (1.50 MI) SOUTHWEST OF OCONTO,

PM0590'11.14 KM (6.90 MI) NORTH OF PENSUKEE, 20.99 KM (13.05 MI) EAST OF

PM0590'OCONTO FALLS. OWNERSHIP--OCONTO AIRPORT PROPERTY. AIRPORT MANAGER,

PM0590'EILEEN DUFFECK PH. 414-829-5429 OR 414-834-3333.

PM0590'THE STATION IS LOCATED AT THE OCONTO AIRPORT. TO REACH FROM THE

PM0590'JUNCTION OF U.S. HIGHWAY 41 AND MCDONALD STREET IN OCONTO, GO WEST FOR

PM0590'2.42 KM (1.50 MI) ON MCDONALD STREET TO THE OCONTO AIRPORT AND THE

PM0590'STATION.

PM0590'THE STATION IS A STANDARD NGS HORIZONTAL CONTROL DISK STAMPED --OCONTO

PM0590'GPS 1989--, SET INTO THE TOP OF A 40 CM DIAMETER CONCRETE MONUMENT SET

PM0590'FLUSH WITH THE GROUND. LOCATED 33.52 M (110.0 FT) NORTH FROM THE WIND

PM0590'SOCK, 0.91 M (3.0 FT) NORTH FROM A CARSONITE WITNESS POST, 53.18 M

PM0590'(174.5 FT) EAST FROM THE EAST EDGE OF THE TAXIWAY, 46.02 M (151.0 FT)

PM0590'SOUTH FROM THE SOUTH EDGE OF THE BIT TARMAC ASPHALT AREA, 93.63 M
PM0590'(307.2 FT) SOUTH FROM THE SOUTHEAST CORNER OF THE NEW ADMINISTRATION
PM0590'BUILDING.

PM0590

PM0590 STATION RECOVERY (1990)

PM0590

PM0590'RECOVERED 1990

PM0590'RECOVERED IN GOOD CONDITION.

PM0590

PM0590 STATION RECOVERY (1990)

PM0590

PM0590'RECOVERED 1990

PM0590'RECOVERED IN GOOD CONDITION.

PM0590

PM0590 STATION RECOVERY (1997)

PM0590

PM0590'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1997 (CSM)

PM0590'THIS IS THE PRIMARY AIRPORT CONTROL (PAC) STATION FOR THE OCONTO
PM0590'MUNICIPAL (OCQ) AIRPORT. THE STATION IS LOCATED ABOUT 2.5 KM (1.55
PM0590'MI) SOUTHWEST OF OCONTO, 11.1 KM (6.90 MI) NORTH OF PENSANKEE, SOUTH
PM0590'OF THE AIRPORT OFFICE AND NORTH OF THE WINDSOCK. OWNERSHIP--CITY OF
PM0590'OCONTO, OCONTO CITY HALL AIRPORT, 2983 AIRPORT ROAD (MC DONALD STREET)
PM0590'OCONTO, WI 54153. PHONE--414 834-2844. AIRPORT MANAGER IS EILEEN
PM0590'DUFFECK, PHONE--920-834-3333. TO REACH THE STATION FROM THE JUNCTION
PM0590'OF U.S. HIGHWAY 41 AND MC DONALD STREET (1ST STREET SOUTH OF THE
PM0590'RIVER BRIDGE) IN OCONTO, GO 2.47 KM (1.55 MI) WESTERLY ALONG MC DONALD
PM0590'STREET (AIRPORT ROAD) TO THE AIRPORT OFFICE ON THE LEFT. THE STATION
PM0590'IS 93.6 M (307.1 FT) SOUTH OF THE SOUTHEAST CORNER OF THE AIRPORT
PM0590'OFFICE, 50.0 M (164.0 FT) SOUTHEAST OF THE SOUTHEAST END OF A CULVERT
PM0590'UNDER THE JUNCTION OF 2 TAXIWAYS AND THE APRON, 33.5 M (109.9 FT)
PM0590'NORTH-NORTHEAST OF THE WINDSOCK, 0.9 M (3.0 FT) NORTH-NORTHWEST OF A
PM0590'WITNESS POST, 0.5 M (1.6 FT) ABOVE THE LEVEL OF THE APRON AND THE
PM0590'MONUMENT IS FLUSH WITH THE GROUND.

PM0590

PM0590 STATION RECOVERY (2001)

PM0590

PM0590'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2001 (MRY)

PM0590'RECOVERED IN GOOD CONDITION.

PM0590

PM0590 STATION RECOVERY (2002)

PM0590

PM0590'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2002

PM0590'RECOVERED IN GOOD CONDITION.

PM0590

PM0590 STATION RECOVERY (2003)

PM0590

PM0590'RECOVERY NOTE BY WI DEPT OF TRANSP 2003

PM0590'RECOVERED AS DESCRIBED.

PM0590'

QM0578 *****
 QM0578 DESIGNATION - Q 222
 QM0578 PID - QM0578
 QM0578 STATE/COUNTY- WI/OCONTO
 QM0578 USGS QUAD - BREED (1973)
 QM0578
 QM0578 *CURRENT SURVEY CONTROL
 QM0578

 QM0578* NAD 83(1986)- 45 04 09. (N) 088 25 28. (W) SCALED
 QM0578* NAVD 88 - 273.527 (meters) 897.40 (feet) ADJUSTED
 QM0578

 QM0578 GEOID HEIGHT- -35.89 (meters) GEOID03
 QM0578 DYNAMIC HT - 273.501 (meters) 897.31 (feet) COMP
 QM0578 MODELED GRAV- 980,512.1 (mgal) NAVD 88
 QM0578
 QM0578 VERT ORDER - FIRST CLASS II
 QM0578
 QM0578.The horizontal coordinates were scaled from a topographic map and have
 QM0578.an estimated accuracy of +/- 6 seconds.
 QM0578
 QM0578.The orthometric height was determined by differential leveling
 QM0578.and adjusted by the National Geodetic Survey in June 1991.
 QM0578
 QM0578.The geoid height was determined by GEOID03.
 QM0578
 QM0578.The dynamic height is computed by dividing the NAVD 88
 QM0578.geopotential number by the normal gravity value computed on the
 QM0578.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 QM0578.degrees latitude (g = 980.6199 gals.).
 QM0578
 QM0578.The modeled gravity was interpolated from observed gravity values.
 QM0578

QM0578;	North	East	Units	Estimated Accuracy
QM0578;SPC WI C	- 138,530.	724,060.	MT	(+/- 180 meters Scaled)

 QM0578
 QM0578 SUPERSEDED SURVEY CONTROL
 QM0578
 QM0578.No superseded survey control is available for this station.
 QM0578
 QM0578_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TCQ878916(NAD 83)
 QM0578_MARKER: I = METAL ROD
 QM0578_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

QM0578 STATION DESCRIPTION
 QM0578
 QM0578'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985
 QM0578'27.2 KM (16.9 MI) NW FROM GILLETT.
 QM0578'17.2 KM (16.9 MI) NORTHWESTERLY ALONG STATE HIGHWAY 32 FROM ITS
 QM0578'JUNCTION WITH STATE HIGHWAY 22 IN GILLETT, 37.8 M (124.0 FT) NORTH OF
 QM0578'THE CENTER OF CENTRAL ROAD, 15.2 M (49.9 FT) EAST OF THE CENTERLINE OF
 QM0578'THE HIGHWAY, 2.9 M (9.5 FT) NORTHEAST OF UTILITY POLE NUMBER 3017
 QM0578'22W31, AND 2.0 M (6.6 FT) NORTH OF A RIGHT-OF-WAY POST. NOTE--ACCESS
 QM0578'TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.
 QM0578'THE MARK IS 0.3 METERS W FROM A WITNESS POST AND FENCE
 QM0578'THE MARK IS 0.5 M ABOVE THE HIGHWAY.
 QM0578
 QM0578 STATION RECOVERY (1999)
 QM0578
 QM0578'RECOVERY NOTE BY US POWER SQUADRON 1999
 QM0578'RECOVERED IN GOOD CONDITION.
 QM0578
 QM0578 STATION RECOVERY (2004)
 QM0578
 QM0578'RECOVERY NOTE BY US POWER SQUADRON 2004 (DRB)
 QM0578'RECOVERED IN GOOD CONDITION. THE STATION IS AT THE JUNCTION OF THE
 QM0578'NORTH BRANCH OF CENTRAL ROAD WITH HIGHWAY 32.

AI2508 *****

AI2508 SACS - This is a Secondary Airport Control Station.

AI2508 DESIGNATION - SHAWANO GPS

AI2508 PID - AI2508

AI2508 STATE/COUNTY- WI/SHAWANO

AI2508 USGS QUAD - SHAWANO (1982)

AI2508

AI2508 *CURRENT SURVEY CONTROL

AI2508

AI2508* NAD 83(1997)- 44 47 25.48011(N) 088 34 02.38305(W) ADJUSTED

AI2508* NAVD 88 - 246.22 (meters) 807.8 (feet) GPS OBS

AI2508

AI2508 X - 113,364.583 (meters) COMP

AI2508 Y - -4,532,761.992 (meters) COMP

AI2508 Z - 4,470,996.684 (meters) COMP

AI2508 LAPLACE CORR- 0.13 (seconds) DEFLEC99

AI2508 ELLIP HEIGHT- 210.04 (meters) (11/17/99) GPS OBS

AI2508 GEOID HEIGHT- -36.08 (meters) GEOID03

AI2508

AI2508 HORZ ORDER - FIRST

AI2508 ELLP ORDER - FIRST CLASS I

AI2508

AI2508.This mark is at Shawano Municipal Airport (3W0)

AI2508

AI2508.The horizontal coordinates were established by GPS observations

AI2508.and adjusted by the National Geodetic Survey in November 1999.

AI2508

AI2508.The orthometric height was determined by GPS observations and a

AI2508.high-resolution geoid model.

AI2508

AI2508.GPS derived orthometric heights for airport stations designated as

AI2508.PACS or SACS are published to 2 decimal places. This maintains

AI2508.centimeter relative accuracy between the PACS and SACS. It does

AI2508.not indicate centimeter accuracy relative to other marks which are

AI2508.part of the NAVD 88 network.

AI2508

AI2508.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AI2508

AI2508.The Laplace correction was computed from DEFLEC99 derived deflections.

AI2508

AI2508.The ellipsoidal height was determined by GPS observations

AI2508.and is referenced to NAD 83.

AI2508

AI2508.The geoid height was determined by GEOID03.

AI2508

AI2508; North East Units Scale Factor Converg.

AI2508;SPC WI C - 107,348.951 713,360.192 MT 0.99994182 +1 00 39.1

AI2508;UTM 16 - 4,960,862.980 376,020.870 MT 0.99978901 -1 06 15.7

AI2508

AI2508! - Elev Factor x Scale Factor = Combined Factor

AI2508!SPC WI C - 0.99996707 x 0.99994182 = 0.99990889

AI2508!UTM 16 - 0.99996707 x 0.99978901 = 0.99975609

AI2508

AI2508|-----|

AI2508| PID Reference Object Distance Geod. Az |

AI2508| dddmss.s |

AI2508| PN1352 FAA 3WO A 187.501 METERS 16521 |

AI2508|-----|

AI2508

AI2508 SUPERSEDED SURVEY CONTROL

AI2508

AI2508.No superseded survey control is available for this station.

AI2508

AI2508_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TCQ7602160863(NAD 83)

AI2508_MARKER: DD = SURVEY DISK

AI2508_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AI2508_STAMPING: SHAWANO GPS 1993

AI2508_MARK LOGO: WIDT

AI2508_MAGNETIC: N = NO MAGNETIC MATERIAL

AI2508_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AI2508+STABILITY: SURFACE MOTION

AI2508_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AI2508+SATELLITE: SATELLITE OBSERVATIONS - 1993

AI2508

AI2508 HISTORY - Date Condition Report By

AI2508 HISTORY - 1993 MONUMENTED WIDT

AI2508

AI2508 STATION DESCRIPTION

AI2508

AI2508'DESCRIBED BY WI DEPT OF TRANSP 1993 (PJH)

AI2508'THE STATION IS LOCATED APPROXIMATELY 53.14 KM (33.00 MI) NORTHWEST OF
AI2508'GREEN BAY AND 3.22 KM (2.00 MI) EAST OF SHAWANO NEAR THE NORTHWEST
AI2508'CORNER OF THE SHAWANO CITY/COUNTY MUNICIPAL AIRPORT. OWNERSHIP--CITY
AI2508'AND COUNTY OF SHAWANO. THE AIRPORT MANAGER IS CLARENCE SCHAMPERS,
AI2508'TELEPHONE 715 526-2465, CONTACT CLARENCE SCHAMPERS 24 HOURS PRIOR TO
AI2508'ACCESSING THE STATION. TO REACH THE STATION FROM THE JUNCTION OF
AI2508'STATE HIGHWAYS 22, 29, 47, AND 55 AT THE INTERSECTION OF MAIN STREET
AI2508'AND GREEN BAY STREET IN THE CITY OF SHAWANO, GO EAST 3.22 KM (2.00 MI)
AI2508'ON HIGHWAYS 22, 29, 47, AND 55 (GREEN BAY STREET) TO THE INTERSECTION
AI2508'WITH COUNTY HIGHWAY HHH (AIRPORT ROAD) , TURN LEFT AND GO NORTH 0.64
AI2508'KM (0.40 MI) ON HIGHWAY HHH TO THE AIRPORT ENTRANCE ROAD ON THE
AI2508'RIGHT, TURN RIGHT AND GO EAST 0.08 KM (0.05 MI) ON GUMAER ROAD TO THE
AI2508'STATION ON THE RIGHT. THE STATION IS A BRONZE WIS DEPT OF
AI2508'TRANSPORTATION GPS GEODETIC CONTROL STATION DISK SET IN THE TOP OF A
AI2508'35-CM (14-INCH) DIAMETER CONCRETE POST RECESSED APPROXIMATELY 5 CM (2
AI2508'INCHES) BELOW GROUND AND ABOUT LEVEL WITH THE ROAD PAVEMENT. THE
AI2508'STATION IS 15.6 M (51.2 FT) SOUTH-SOUTHEAST OF THE CENTERLINE OF THE
AI2508'ROAD, APPROXIMATELY 90 M (295.3 FT) NORTH-NORTHEAST OF THE EXTENDED
AI2508'CENTERLINE OF RUNWAY 11/29, 32.4 M (106.3 FT) EAST OF TELEPHONE
AI2508'PEDESTAL L4B 8A, 24.3 M (79.7 FT) SOUTH-SOUTHEAST OF A FIRE HYDRANT
AI2508'LOCATED BETWEEN THE BUILDINGS AT FIRE NUMBER W6472 AND W6476, 7.1 M
AI2508'(23.3 FT) SOUTH-SOUTHWEST OF THE EXTENDED CENTERLINE OF THE CONCRETE
AI2508'APPROACH SLAB FOR THE GARAGE AT W6472 GUMAER ROAD, AND 0.37 M (1.21
AI2508'FT) NORTH-NORTHWEST OF A WHITE WITNESS POST. ---NOTE---THE STATION
AI2508'HAS NO VISIBBLE OBSTRUCTION EXTENDING HIGHER THAN 5 DEGREES ABOVE THE
AI2508'HORIZON EXCEPT SOME TREES TO THE NORTH AND NORTHEAST ACROSS GUMAER
AI2508'ROAD EXTENDING TO 15 DEGREES ABOVE THE HORIZON. THIS STATION IS
AI2508'DESIGNATED AS A SECONDARY AIRPORT CONTROL STATION.

QL0664 *****
 QL0664 CBN - This is a Cooperative Base Network Control Station.
 QL0664 DESIGNATION - WAUSAUKEE GPS
 QL0664 PID - QL0664
 QL0664 STATE/COUNTY- WI/MARINETTE
 QL0664 USGS QUAD - WAUSAUKEE SOUTH (1982)
 QL0664
 QL0664 *CURRENT SURVEY CONTROL
 QL0664
 QL0664* NAD 83(1997)- 45 21 49.62286(N) 087 57 14.64816(W) ADJUSTED
 QL0664* NAVD 88 - 229.4 (meters) 753. (feet) GPS OBS
 QL0664
 QL0664 X - 160,261.928 (meters) COMP
 QL0664 Y - -4,486,186.833 (meters) COMP
 QL0664 Z - 4,515,982.977 (meters) COMP
 QL0664 LAPLACE CORR- -5.90 (seconds) DEFLEC99
 QL0664 ELLIP HEIGHT- 193.52 (meters) (04/28/99) GPS OBS
 QL0664 GEOID HEIGHT- -35.96 (meters) GEOID03
 QL0664
 QL0664 HORZ ORDER - A
 QL0664 ELLP ORDER - THIRD CLASS I
 QL0664
 QL0664.The horizontal coordinates were established by GPS observations
 QL0664.and adjusted by the National Geodetic Survey in April 1999.
 QL0664
 QL0664.The orthometric height was determined by GPS observations and a
 QL0664.high-resolution geoid model.
 QL0664
 QL0664.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 QL0664
 QL0664.The Laplace correction was computed from DEFLEC99 derived deflections.
 QL0664
 QL0664.The ellipsoidal height was determined by GPS observations
 QL0664.and is referenced to NAD 83.
 QL0664
 QL0664.The geoid height was determined by GEOID03.
 QL0664
 QL0664;

	North	East	Units	Scale	Factor	Converg.
QL0664!SPC WI C	- 172,085.736	760,270.476	MT	0.99997690	+1 26 36.8	
QL0664!UTM 16	- 5,023,806.185	425,282.164	MT	0.99966864	-0 40 44.1	

 QL0664!
 QL0664! - Elev Factor x Scale Factor = Combined Factor
 QL0664!SPC WI C - 0.99996966 x 0.99997690 = 0.99994656
 QL0664!UTM 16 - 0.99996966 x 0.99966864 = 0.99963831
 QL0664
 QL0664 SUPERSEDED SURVEY CONTROL
 QL0664
 QL0664 NAD 83(1991)- 45 21 49.62247(N) 087 57 14.64622(W) AD() B
 QL0664 ELLIP H (06/11/91) 193.57 (m) GP() 4 1
 QL0664 NGVD 29 (06/11/91) 229.3 (m) 752. (f) GPS OBS
 QL0664
 QL0664.Superseded values are not recommended for survey control.
 QL0664.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 QL0664.See file dsdata.txt to determine how the superseded data were derived.
 QL0664
 QL0664_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TDR2528223806(NAD 83)

QL0664_MARKER: DH = HORIZONTAL CONTROL DISK
 QL0664_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 QL0664_SP_SET: CONCRETE POST
 QL0664_STAMPING: WAUSAUKEE GPS 1989
 QL0664_MARK LOGO: NGS
 QL0664_PROJECTION: FLUSH
 QL0664_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT
 QL0664_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 QL0664+STABILITY: SURFACE MOTION
 QL0664_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 QL0664+SATELLITE: SATELLITE OBSERVATIONS - April 11, 2001

QL0664
 QL0664 HISTORY - Date Condition Report By
 QL0664 HISTORY - 1989 MONUMENTED WIHD
 QL0664 HISTORY - 19900719 GOOD
 QL0664 HISTORY - 19971001 GOOD WIHD
 QL0664 HISTORY - 20010411 GOOD MIDT

QL0664
 QL0664 STATION DESCRIPTION
 QL0664

QL0664'DESCRIBED BY WI HIGHWAY DEPT 1989
 QL0664'THE STATION IS LOCATED ABOUT 38.9 KM (24.15 MI) NORTHWEST OF
 QL0664'MARINETTE, 12.2 KM (7.60 MI) SOUTHEAST OF ATHELSTANE, 14.6 KM
 QL0664'(9.05 MI) NORTH OF CRIVITZ. OWNERSHIP--COUNTY ROAD R.O.W.
 QL0664'TO REACH FROM THE INTERSECTION OF STATE HIGHWAY 180 AND U.S. HIGHWAY
 QL0664'141 IN WAUSAUKEE, GO WEST FOR 0.08 KM (0.05 MI) ON U.S HIGHWAY 180 TO
 QL0664'FIRST ROAD. TURN LEFT AND GO SOUTH FOR 0.41 KM (0.25 MI) ON FIRST
 QL0664'ROAD TO THE STATION ON THE LEFT.
 QL0664'STATION IS A STANDARD NGS HORIZONTAL CONTROL DISK STAMPED -- WAUSAUKEE
 QL0664'GPS 1989--, SET INTO THE TOP OF A 40 CM DIAMETER CONCRETE MONUMENT SET
 QL0664'FLUSH WITH THE GROUND. LOCATED ON A SMALL INCLINE CLOSE TO THE
 QL0664'RAILROAD TRACKS, 0.91 M (3.0 FT) WEST FROM A CARSONITE WITNESS POST,
 QL0664'12.65 M (41.5 FT) EAST FROM THE CENTER-LINE OF FIRST ROAD, 10.82 M
 QL0664'(35.5 FT) WEST FROM THE WEST RAIL OF THE RAILROAD TRACKS.

QL0664
 QL0664 STATION RECOVERY (1990)
 QL0664

QL0664'RECOVERED 1990
 QL0664'RECOVERED IN GOOD CONDITION.

QL0664
 QL0664 STATION RECOVERY (1997)
 QL0664

QL0664'RECOVERY NOTE BY WI HIGHWAY DEPT 1997 (CSM)
 QL0664'THE STATION IS LOCATED ABOUT 93.38 KM (58.00 MI) NORTH OF GREEN BAY,
 QL0664'38.62 KM (24.00 MI) NORTHWEST OF MARINETTE, AND 0.8 KM (0.50 MI) SOUTH
 QL0664'OF WAUSAUKEE BETWEEN 1ST STREET AND THE RAILROAD TRACKS ON A DIRT
 QL0664'MOUND ABOUT 10 METERS (32.8 FT) ACROSS AT THE BASE AND ABOUT 1.5
 QL0664'METERS (4.9 FT) HIGH. TO REACH THE STATION FROM THE JUNCTION OF US
 QL0664'HIGHWAY 141 WITH STATE HIGHWAY 180 AT THE SOUTH END OF THE VILLAGE OF
 QL0664'WAUSAUKEE, GO WEST 0.08 KM (0.05 MI) ACROSS THE RAILROAD TRACKS ON A
 QL0664'ROAD WHICH IS AN EXTENSION OF HIGHWAY 180 TO 1ST STREET, TURN LEFT AND
 QL0664'GO SOUTH 0.4 KM (0.25 MI) ON 1ST STREET TO THE STATION ON THE LEFT.
 QL0664'THE STATION IS A BRASS NGS HORIZONTAL CONTROL MARK DISK SET IN THE TOP
 QL0664'OF A 40-CM (16-INCH) DIAMETER, 6-FOOT-DEEP CONCRETE POST FLUSH WITH
 QL0664'THE GROUND. THE STATION IS 12.2 M (40.0 FT) EAST OF THE CENTERLINE OF
 QL0664'1ST STREET, 10.6 M (34.8 FT) WEST OF THE WEST RAIL OF THE MAIN TRACK,

QL0664'34.3 M (112.5 FT) WEST OF THE WEST POST OF A HIGHWAY SIGN STATING
QL0664'DISTANCES --CRIVITZ 10, POUND 21, GREEN BAY 62--, 44.3 M (145.3 FT)
QL0664'WEST OF THE CENTERLINE OF HIGHWAY 141, 193 M (633.2 FT) NORTH OF A
QL0664'FROG ON THE EAST RAIL OF THE MAIN TRACK, 0.9 M (3.0 FT) WEST OF AN
QL0664'ORANGE FIBERGLASS WITNESS POST, AND 0.9 M (3.0 FT) WEST OF A WHITE
QL0664'PLASTIC WITNESS POST.

QL0664

STATION RECOVERY (2001)

QL0664

QL0664

QL0664'RECOVERY NOTE BY MICHIGAN DEPARTMENT OF TRANSPORTATION 2001 (SHN)

QL0664'RECOVERED IN GOOD CONDITION.

PN0823 *****

PN0823 DESIGNATION - Y 227

PN0823 PID - PN0823

PN0823 STATE/COUNTY- WI/OCONTO

PN0823 USGS QUAD - PULASKI (1974)

PN0823

PN0823 *CURRENT SURVEY CONTROL

PN0823

PN0823* NAD 83(1997)- 44 41 12.48728(N) 088 14 32.80183(W) ADJUSTED

PN0823* NAVD 88 - 245.778 (meters) 806.36 (feet) ADJUSTED

PN0823 X - 139,313.254 (meters) COMP

PN0823 Y - -4,540,146.672 (meters) COMP

PN0823 Z - 4,462,817.607 (meters) COMP

PN0823 LAPLACE CORR- -0.13 (seconds) DEFLEC99

PN0823 ELLIP HEIGHT- 209.60 (meters) (04/28/99) GPS OBS

PN0823 GEOID HEIGHT- -36.16 (meters) GEOID03

PN0823 DYNAMIC HT - 245.749 (meters) 806.26 (feet) COMP

PN0823 MODELED GRAV- 980,494.2 (mgal) NAVD 88

PN0823

PN0823 HORZ ORDER - A

PN0823 VERT ORDER - FIRST CLASS II

PN0823 ELLP ORDER - THIRD CLASS I

PN0823

PN0823.The horizontal coordinates were established by GPS observations
 PN0823.and adjusted by the National Geodetic Survey in April 1999.

PN0823

PN0823.The orthometric height was determined by differential leveling
 PN0823.and adjusted by the National Geodetic Survey in June 1991.

PN0823

PN0823.The X, Y, and Z were computed from the position and the ellipsoidal ht.

PN0823

PN0823.The Laplace correction was computed from DEFLEC99 derived deflections.

PN0823

PN0823.The ellipsoidal height was determined by GPS observations
 PN0823.and is referenced to NAD 83.

PN0823

PN0823.The geoid height was determined by GEOID03.

PN0823

PN0823.The dynamic height is computed by dividing the NAVD 88
 PN0823.geopotential number by the normal gravity value computed on the
 PN0823.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PN0823.degrees latitude (g = 980.6199 gals.).

PN0823

PN0823.The modeled gravity was interpolated from observed gravity values.

PN0823

PN0823;	North	East	Units	Scale	Factor	Converg.
PN0823;SPC WI C	- 96,343.511	739,312.151	MT	0.99994614	+1 14 24.3	
PN0823;UTM 16	- 4,948,909.788	401,544.225	MT	0.99971920	-0 52 25.7	

PN0823

PN0823! - Elev Factor x Scale Factor = Combined Factor

PN0823!SPC WI C - 0.99996714 x 0.99994614 = 0.99991328

PN0823!UTM 16 - 0.99996714 x 0.99971920 = 0.99968635

PN0823

PN0823 SUPERSEDED SURVEY CONTROL

PN0823

PN0823 NAVD 88 (04/28/99) 245.78 (m) 806.4 (f) LEVELING 3
PN0823

PN0823.Superseded values are not recommended for survey control.

PN0823.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

PN0823.See file dsdata.txt to determine how the superseded data were derived.

PN0823

PN0823_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TDQ0154448910(NAD 83)

PN0823_MARKER: I = METAL ROD

PN0823_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

PN0823_SP_SET: STAINLESS STEEL ROD

PN0823_STAMPING: Y 227 1985

PN0823_MARK LOGO: NGS

PN0823_PROJECTION: PROJECTING 10 CENTIMETERS

PN0823_MAGNETIC: I = MARKER IS A STEEL ROD

PN0823_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

PN0823_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

PN0823+SATELLITE: SATELLITE OBSERVATIONS - November 10, 1997

PN0823_ROD/PIPE-DEPTH: 5.6 meters

PN0823

PN0823 HISTORY	- Date	Condition	Report By
PN0823 HISTORY	- 1985	MONUMENTED	NGS
PN0823 HISTORY	- 19971110	GOOD	NGS
PN0823 HISTORY	- 19991112	GOOD	USPSQD

PN0823

PN0823 STATION DESCRIPTION

PN0823

PN0823'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985

PN0823'24.6 KM (15.3 MI) NW FROM GREEN BAY.

PN0823'24.6 KM (15.2 MI) NORTHWESTERLY ALONG STATE HIGHWAY 32 FROM ITS
PN0823'JUNCTION WITH U.S. HIGHWAY 41 IN GREEN BAY, AT THE NORTHWEST CORNER OF
PN0823'THE POLISH NATIONAL CEMETARY, 18.7 M (61.4 FT) EAST OF THE CENTERLINE
PN0823'OF THE HIGHWAY, 10.6 M (34.8 FT) SOUTH OF THE CENTER OF SOUTH CHASE
PN0823'ROAD, AND 2.8 M (9.2 FT) SOUTH OF A UTILITY POLE. NOTE--ACCESS TO
PN0823'DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.

PN0823'THE MARK IS 0.3 METERS W FROM A WITNESS POST AND FENCE

PN0823'THE MARK IS 0.6 M BELOW THE HIGHWAY.

PN0823

PN0823 STATION RECOVERY (1997)

PN0823

PN0823'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1997 (CSM)

PN0823'THE STATION IS LOCATED 1.6 KM (1.00 MI) NORTH OF PULASKI AT THE

PN0823'NORTHWEST CORNER OF THE POLISH NATIONAL CEMENTERY.

PN0823'OWNERSHIP--WISCONSIN DEPARTMENT OF TRANSPORTATION. PO BOX 7916

PN0823'MADISON WI, 53707, PHONE 608-267-2462. TO REACH THE STATION FROM THE

PN0823'JUNCTION OF STATE HIGHWAYS 32 AND 160 IN PULASKI, GO NORTH ON STATE

PN0823'HIGHWAY 32 FOR 1.61 KM (1.00 MI) TO THE INTERSECTION OF S CHASE ROAD

PN0823'AND THE STATION ON THE RIGHT. THE STATION IS 18.4 M (60.4 FT) EAST OF

PN0823'THE HIGHWAY CENTER LINE, 10.5 M (34.4 FT) SOUTH OF THE ROAD CENTER,

PN0823'2.6 M (8.5 FT) SOUTH OF A UTILITY POLE WITH 3 GUY CABLES, 0.5 M (1.6

PN0823'FT) BELOW THE LEVEL OF THE HIGHWAY, AND 0.3 M (1.0 FT) NORTHWEST OF A

PN0823'WITNESS POST. NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH

PN0823'LOGO CAP.

PN0823

PN0823 STATION RECOVERY (1999)

PN0823

PN0823'RECOVERY NOTE BY US POWER SQUADRON 1999

PN0823'RECOVERED IN GOOD CONDITION.

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PM0231 *****
PM0231 DESIGNATION - L 129
PM0231 PID - PM0231
PM0231 STATE/COUNTY- WI/OCONTO
PM0231 USGS QUAD - PENSUKEE (1974)
PM0231
PM0231 *CURRENT SURVEY CONTROL
PM0231
PM0231 * NAD 83(1986)- 44 47 42. (N) 087 55 14. (W) SCALED
PM0231 * NAVD 88 - 182.626 (meters) 599.17 (feet) ADJUSTED
PM0231
PM0231 GEOID HEIGHT- -36.38 (meters) GEOID03
PM0231 DYNAMIC HT - 182.608 (meters) 599.11 (feet) COMP
PM0231 MODELED GRAV- 980,513.7 (mgal) NAVD 88
PM0231
PM0231 VERT ORDER - FIRST CLASS 0
PM0231
PM0231.The horizontal coordinates were scaled from a topographic map and have
PM0231.an estimated accuracy of +/- 6 seconds.
PM0231
PM0231.The orthometric height was determined by differential leveling
PM0231.and adjusted by the National Geodetic Survey in June 1991.
PM0231
PM0231.The geoid height was determined by GEOID03.
PM0231
PM0231.The dynamic height is computed by dividing the NAVD 88
PM0231.geopotential number by the normal gravity value computed on the
PM0231.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
PM0231.degrees latitude (g = 980.6199 gals.).
PM0231
PM0231.The modeled gravity was interpolated from observed gravity values.
PM0231
PM0231; North East Units Estimated Accuracy
PM0231;SPC WI C - 108,970. 764,510. MT (+/- 180 meters Scaled)
PM0231
PM0231 SUPERSEDED SURVEY CONTROL
PM0231
PM0231.No superseded survey control is available for this station.
PM0231
PM0231_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TDQ271605(NAD 83)
PM0231_MARKER: DB = BENCH MARK DISK
PM0231_SETTING: 66 = SET IN ROCK OUTCROP
PM0231_SP_SET: EXPOSED ROCK
PM0231_STAMPING: L 129 1972
PM0231_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
PM0231+STABILITY: POSITION/ELEVATION WELL
PM0231
PM0231 HISTORY - Date Condition Report By
PM0231 HISTORY - 1972 MONUMENTED NGS
PM0231 HISTORY - 19901103 GOOD USPSQD
PM0231 HISTORY - 19961002 GOOD USPSQD
PM0231 HISTORY - 20021010 GOOD USPSQD
PM0231
PM0231 STATION DESCRIPTION
PM0231
PM0231'DESCRIBED BY NATIONAL GEODETIC SURVEY 1972

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PM0231 2.05 MI S FROM PENSsauKEE.

PM0231 ABOUT 2.05 MILES SOUTH ALONG COUNTY ROAD S FROM THE BRIDGE OVER THE
PM0231 PENSsauKEE RIVER AT PENSsauKEE, SET IN THE TOP OF A MASS OF EXPOSED ROCK
PM0231 THAT COVER THE GENERAL AREA, 102 FEET NORTHWEST OF THE JUNCTION OF THE
PM0231 COUNTY ROAD AND A DRIVEWAY LEADING TO A 1 1/2 STORY FRAME HOUSE, 31
PM0231 FEET WEST OF THE CENTER LINE OF THE ROAD, 11 FEET EAST OF A FENCE
PM0231 LINE, 11.6 FEET SOUTH OF A METAL WITNESS POST, AND ABOUT 1 FOOT BELOW
PM0231 THE LEVEL OF THE ROAD. SECTION 23, T 27N, R 21E.

PM0231

STATION RECOVERY (1990)

PM0231

PM0231

PM0231 RECOVERY NOTE BY US POWER SQUADRON 1990 (RPT)

PM0231 RECOVERED IN GOOD CONDITION.

PM0231

STATION RECOVERY (1996)

PM0231

PM0231

PM0231 RECOVERY NOTE BY US POWER SQUADRON 1996

PM0231 RECOVERED IN GOOD CONDITION.

PM0231

STATION RECOVERY (2002)

PM0231

PM0231

PM0231 RECOVERY NOTE BY US POWER SQUADRON 2002 (BAA)

PM0231 RECOVERED IN GOOD CONDITION.

PN0136 *****

PN0136 DESIGNATION - STA 606

PN0136 PID - PN0136

PN0136 STATE/COUNTY- WI/OCONTO

PN0136 USGS QUAD - LENA (1974)

PN0136

PN0136 *CURRENT SURVEY CONTROL

PN0136* NAD 83(1986)- 44 57 04. (N) 088 02 56. (W) SCALED

PN0136* NAVD 88 - 217.749 (meters) 714.40 (feet) ADJUSTED

PN0136 GEOID HEIGHT- -36.37 (meters) GEOID03

PN0136 DYNAMIC HT - 217.727 (meters) 714.33 (feet) COMP

PN0136 MODELED GRAV- 980,513.7 (mgal) NAVD 88

PN0136

PN0136 VERT ORDER - SECOND CLASS 0

PN0136

PN0136.The horizontal coordinates were scaled from a topographic map and have

PN0136.an estimated accuracy of +/- 6 seconds.

PN0136

PN0136.The orthometric height was determined by differential leveling

PN0136.and adjusted by the National Geodetic Survey in June 1991.

PN0136

PN0136.The geoid height was determined by GEOID03.

PN0136

PN0136.The dynamic height is computed by dividing the NAVD 88

PN0136.geopotential number by the normal gravity value computed on the

PN0136.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

PN0136.degrees latitude (g = 980.6199 gals.).

PN0136

PN0136.The modeled gravity was interpolated from observed gravity values.

PN0136

PN0136;	North	East	Units	Estimated Accuracy
PN0136;SPC WI C	- 126,060.	753,950.	MT	(+/- 180 meters Scaled)

PN0136

PN0136 SUPERSEDED SURVEY CONTROL

PN0136

PN0136 NGVD 29 (??/??/92) 217.774 (m) 714.48 (f) ADJ UNCH 2 0

PN0136

PN0136.Superseded values are not recommended for survey control.

PN0136.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

PN0136.See file dsdata.txt to determine how the superseded data were derived.

PN0136

PN0136_U.S. NATIONAL GRID SPATIAL ADDRESS: 16TDQ172780(NAD 83)

PN0136_MARKER: DB = BENCH MARK DISK

PN0136_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

PN0136_SP_SET: SET IN TOP OF CONCRETE MONUMENT

PN0136_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

PN0136+STABILITY: SURFACE MOTION

PN0136

PN0136 HISTORY	- Date	Condition	Report By
PN0136 HISTORY	- UNK	MONUMENTED	CGS
PN0136 HISTORY	- 1934	GOOD	NGS

PN0136

PN0136 STATION DESCRIPTION

PN0136

PN0136'DESCRIBED BY NATIONAL GEODETIC SURVEY 1934

PN0136'IN LENA.

PN0136'IN LENA. ALONG C.M.ST.P. AND P. R.R., IN SW. CORNER OF PARK

PN0136'ACROSS TRACKS TO THE E. FROM STATION. MARK IS 7 YDS. E. OF

PN0136'CENTERLINE OF MAIN TRACK, 7 YDS. N. OF N. CURB OF MAIN ST., 65

PN0136'YDS. S. OF STATION AND 3 YDS. NE. OF POLE.