

# ***GROUND CONTROL SURVEY REPORT***

**GPS SURVEY  
FOR LIDAR CONTROL**

**RICHLAND COUNTY, WI WROC LIDAR SURVEY**

**RICHLAND COUNTY, WISCONSIN**

*Services provided by:*

**AYRES**  

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**ASSOCIATES**

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## **ABSTRACT**

This report documents the GPS ground surveys conducted in support of FEMA accuracy testing of the lidar data collection for Richland County, Wisconsin, in 2010. Surveys were conducted at 5 sites utilizing the base stations established in the static network. These surveys established “ground truth” data at each site on different surface types, including bare earth, low grass, brush lands, low trees, forest, high grass, weeds, crops, and urban areas. Statistical comparisons were made between ground truth points collected from the ground survey and the elevation at the associated horizontal coordinates represented on the LiDAR-derived digital terrain model.

## **SAMPLE POINTS/TEST POINTS**

The ground survey test points were distributed and categorized into sites as shown in the Test Survey Locations map on the next page.

## **DATA ANALYSIS**

To qualify as an acceptable accuracy test, the lidar data must be compared with a dataset of higher accuracy – in this instance ground survey. To develop a comparable dataset of points from the lidar dataset, a utility from proprietary software was used.

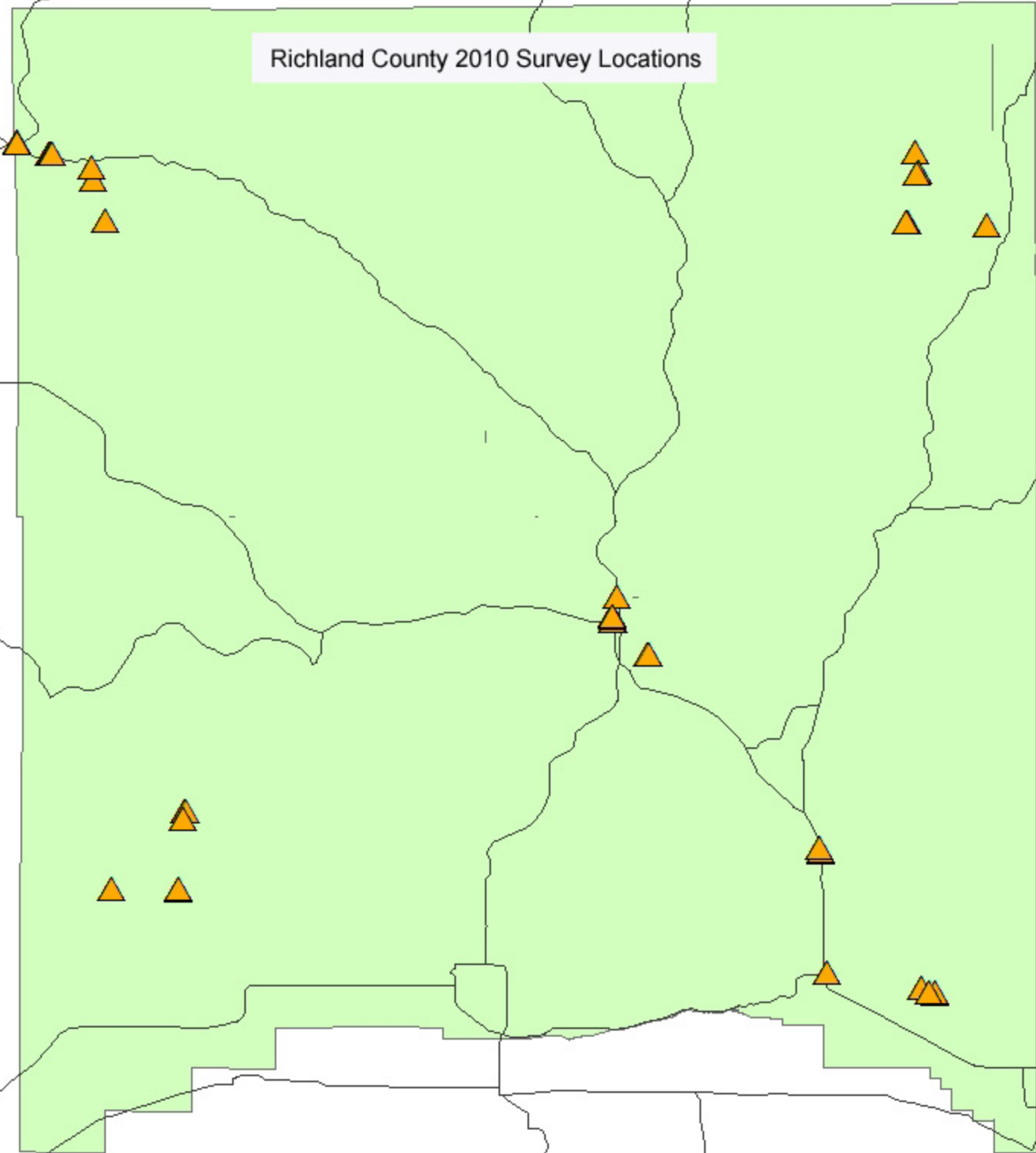
The ground control survey results were imported into an ESRI Pointz shapefile with each point’s information as attributes. The utility then accessed the lidar and generated a triangulated irregular network (TIN), which is a continuous digital terrain surface, using the bare-earth lidar points and the compiled breaklines. The utility probed the TIN surface to determine its elevations at each of the survey point’s horizontal locations.

The elevation was then appended as a field to the Pointz shapefile; the attributes for each point were exported to a database; and then statistical analysis was performed. The results can be seen on the following pages.

## **OVERALL ACCURACY**

A comparison of ground survey versus lidar model values indicates a vertical root mean square error (RMSEz) of 0.2019 feet. This is within the FEMA specified vertical accuracy tolerance of 0.6. This RMSEz equates to a tested 0.396 feet vertical accuracy at 95% confidence level.

Richland County 2010 Survey Locations



**GROUND TRUTH ANALYSIS**  
Comparison of Lidar Points to Ground-Truth Points  
Richland County Coordinate System WISCRS  
NAD 83 HARN / NAVD 88, survey feet

Field definitions

Name – The designation given to the ground survey point to identify it with its coordinates and land cover type

X, Y, and Z – The coordinates that describe the point's horizontal and vertical location within the Richland County WISCRS Coordinate System. The X and Y values are shared between the ground control points and lidar comparison points. The Z field shows the elevation of the survey number. The lidar comparison point's elevation is implicit in the analysis' delta Z

Delta Z – The error, the difference between the elevation at a horizontal location as determined by ground survey and as determined by the lidar dataset

Delta Z Squared – The value of squaring Delta Z

Land Cover – The predominant land cover category at the location of the survey point

Statistic definitions

Sum – The sum of the analysis' Delta Z Squared values

Average – The average of the analysis' Delta Z Squared values

RMSE – The root mean squared error, the square root of the average of the squared errors

Accuracyz – The product of multiplying the RMSE with 1.96, a conversion between the RMSE value and a value with a 95% confidence level

| Name | X          | Y          | Z       | Delta Z   | Delta Z Squared | TYPE      |
|------|------------|------------|---------|-----------|-----------------|-----------|
| 5338 | 712817.984 | 504021.948 | 1270.16 | 0.000000  | 0.000000        | ASPH      |
| 5085 | 600892.072 | 507831.548 | 767.86  | 0.001000  | 0.000001        | ASPH      |
| 5313 | 712868.404 | 504102.885 | 1272.01 | -0.001000 | 0.000001        | TALL GRAS |
| 5572 | 701616.971 | 404476.367 | 711.13  | 0.001000  | 0.000001        | TALL GRAS |
| 5233 | 621763.662 | 424633.717 | 1124.90 | 0.002000  | 0.000004        | GRAV      |
| 5276 | 712616.480 | 506600.651 | 1172.30 | -0.002000 | 0.000004        | LOW GRASS |
| 5611 | 713293.773 | 402667.692 | 715.62  | -0.002000 | 0.000004        | LOW GRASS |
| 5663 | 700772.703 | 419611.129 | 728.34  | 0.002000  | 0.000004        | GRAV      |
| 5678 | 700675.687 | 420083.767 | 723.29  | -0.002000 | 0.000004        | ASPH      |
| 5331 | 712825.210 | 504026.962 | 1270.20 | 0.003000  | 0.000009        | ASPH      |
| 5656 | 700776.082 | 419619.016 | 728.40  | 0.003000  | 0.000009        | GRAV      |
| 5199 | 620991.450 | 414859.491 | 1019.88 | -0.004000 | 0.000016        | ASPH      |
| 5240 | 621771.983 | 424635.596 | 1124.92 | -0.004000 | 0.000016        | GRAV      |
| 5341 | 712825.745 | 504018.440 | 1270.00 | -0.004000 | 0.000016        | ASPH      |
| 5053 | 610062.809 | 504739.781 | 806.07  | -0.005000 | 0.000025        | TALL GRAS |
| 5064 | 610061.192 | 504717.641 | 806.12  | -0.005000 | 0.000025        | TALL GRAS |
| 5248 | 621767.132 | 424645.537 | 1125.23 | 0.005000  | 0.000025        | GRAV      |
| 5609 | 713288.937 | 402679.281 | 715.57  | 0.005000  | 0.000025        | LOW GRASS |
| 5623 | 713303.303 | 402674.438 | 715.76  | -0.005000 | 0.000025        | LOW GRASS |
| 5095 | 600883.827 | 507830.373 | 767.70  | -0.006000 | 0.000036        | ASPH      |
| 5187 | 620983.209 | 414856.912 | 1020.18 | -0.006000 | 0.000036        | ASPH      |
| 5228 | 621762.635 | 424629.485 | 1124.67 | 0.006000  | 0.000036        | GRAV      |
| 5435 | 674829.228 | 448209.949 | 733.31  | 0.006000  | 0.000036        | LOW GRASS |
| 5498 | 675478.974 | 451255.823 | 735.24  | -0.006000 | 0.000036        | GRAV      |
| 5411 | 675024.705 | 448238.901 | 733.36  | -0.007000 | 0.000049        | ASPH      |
| 5484 | 675491.670 | 451259.820 | 735.16  | 0.007000  | 0.000049        | GRAV      |
| 5128 | 605132.462 | 506409.558 | 766.82  | -0.007000 | 0.000049        | TREE COVE |
| 5131 | 605142.257 | 506408.695 | 766.83  | 0.007000  | 0.000049        | TREE COVE |
| 5205 | 620875.471 | 414914.733 | 1032.59 | 0.008000  | 0.000064        | LOW GRASS |
| 5438 | 674822.148 | 448213.475 | 733.30  | -0.008000 | 0.000064        | LOW GRASS |
| 5601 | 713283.977 | 402682.817 | 715.58  | 0.008000  | 0.000064        | LOW GRASS |
| 5249 | 621771.358 | 424644.395 | 1125.18 | -0.009000 | 0.000081        | GRAV      |
| 5334 | 712813.719 | 504026.314 | 1270.33 | 0.009000  | 0.000081        | ASPH      |
| 5349 | 712821.560 | 504013.818 | 1269.89 | -0.009000 | 0.000081        | ASPH      |
| 5495 | 675482.984 | 451263.501 | 735.23  | -0.009000 | 0.000081        | GRAV      |
| 5108 | 604910.968 | 506462.365 | 764.86  | -0.010000 | 0.000100        | BRUSH     |
| 5116 | 604916.927 | 506457.342 | 764.99  | -0.010000 | 0.000100        | BRUSH     |
| 5333 | 712817.827 | 504026.579 | 1270.28 | 0.010000  | 0.000100        | ASPH      |
| 5418 | 675022.463 | 448246.337 | 733.39  | -0.010000 | 0.000100        | ASPH      |
| 5624 | 713303.303 | 402678.370 | 715.73  | -0.010000 | 0.000100        | LOW GRASS |
| 5527 | 674873.838 | 448767.972 | 734.60  | -0.010000 | 0.000100        | TREE COVE |
| 5186 | 620982.097 | 414861.197 | 1020.35 | 0.011000  | 0.000121        | ASPH      |
| 5193 | 620988.375 | 414853.957 | 1019.90 | 0.011000  | 0.000121        | ASPH      |
| 5401 | 675019.138 | 448233.639 | 733.45  | -0.011000 | 0.000121        | ASPH      |
| 5377 | 721378.898 | 497428.585 | 1232.91 | -0.011000 | 0.000121        | TREE COVE |
| 5117 | 604922.331 | 506457.318 | 765.11  | -0.012000 | 0.000144        | BRUSH     |
| 5230 | 621770.594 | 424628.140 | 1124.68 | -0.012000 | 0.000144        | GRAV      |
| 5415 | 675014.738 | 448248.979 | 733.47  | -0.012000 | 0.000144        | ASPH      |
| 5478 | 675495.891 | 451255.909 | 735.17  | -0.012000 | 0.000144        | GRAV      |
| 5520 | 679319.848 | 444154.752 | 798.88  | 0.012000  | 0.000144        | BRUSH     |
| 5283 | 712608.694 | 506605.607 | 1171.49 | -0.013000 | 0.000169        | LOW GRASS |
| 5616 | 713298.359 | 402667.312 | 715.61  | -0.013000 | 0.000169        | LOW GRASS |
| 5699 | 700693.606 | 420080.840 | 723.68  | -0.014000 | 0.000196        | ASPH      |
| 5083 | 600893.079 | 507821.067 | 767.67  | 0.015000  | 0.000225        | ASPH      |
| 5194 | 620989.569 | 414849.876 | 1019.77 | -0.015000 | 0.000225        | ASPH      |
| 5332 | 712821.729 | 504026.908 | 1270.22 | -0.016000 | 0.000256        | ASPH      |
| 5493 | 675483.039 | 451255.631 | 735.21  | -0.016000 | 0.000256        | GRAV      |
| 5512 | 679327.183 | 444158.245 | 798.82  | 0.016000  | 0.000256        | BRUSH     |

|      |            |            |         |           |                    |
|------|------------|------------|---------|-----------|--------------------|
| 5417 | 675020.184 | 448248.702 | 733.42  | -0.017000 | 0.000289 ASPH      |
| 5606 | 713289.264 | 402667.439 | 715.62  | 0.017000  | 0.000289 LOW GRASS |
| 5668 | 700768.607 | 419611.398 | 728.25  | 0.017000  | 0.000289 GRAV      |
| 5449 | 674818.693 | 448220.586 | 733.30  | -0.018000 | 0.000324 LOW GRASS |
| 5044 | 610382.426 | 503190.878 | 838.18  | -0.019000 | 0.000361 GRAV      |
| 5416 | 675017.460 | 448251.527 | 733.44  | -0.019000 | 0.000361 ASPH      |
| 5285 | 712599.368 | 506606.410 | 1170.61 | -0.020000 | 0.000400 LOW GRASS |
| 5440 | 674815.254 | 448213.070 | 733.23  | -0.020000 | 0.000400 LOW GRASS |
| 5613 | 713293.689 | 402675.093 | 715.65  | 0.020000  | 0.000400 LOW GRASS |
| 5074 | 610065.409 | 504723.490 | 806.19  | -0.021000 | 0.000441 TALL GRAS |
| 5080 | 600897.854 | 507819.593 | 767.59  | 0.021000  | 0.000441 ASPH      |
| 5195 | 620990.934 | 414846.123 | 1019.61 | 0.021000  | 0.000441 ASPH      |
| 5236 | 621757.783 | 424639.390 | 1125.01 | -0.021000 | 0.000441 GRAV      |
| 5651 | 700779.942 | 419604.967 | 728.47  | -0.021000 | 0.000441 GRAV      |
| 5436 | 674829.473 | 448213.573 | 733.24  | 0.022000  | 0.000484 LOW GRASS |
| 5632 | 714313.976 | 402136.914 | 718.80  | -0.022000 | 0.000484 TREE COVE |
| 5115 | 604916.477 | 506461.933 | 764.84  | 0.023000  | 0.000529 BRUSH     |
| 5229 | 621766.666 | 424628.809 | 1124.63 | -0.023000 | 0.000529 GRAV      |
| 5277 | 712598.047 | 506602.379 | 1170.70 | -0.023000 | 0.000529 LOW GRASS |
| 5360 | 711511.322 | 497829.504 | 1202.47 | -0.023000 | 0.000529 BRUSH     |
| 5581 | 715020.775 | 402000.221 | 720.41  | 0.023000  | 0.000529 BRUSH     |
| 5612 | 713293.693 | 402671.247 | 715.67  | -0.023000 | 0.000529 LOW GRASS |
| 5617 | 713298.651 | 402670.816 | 715.57  | 0.023000  | 0.000529 LOW GRASS |
| 5250 | 621775.282 | 424643.556 | 1125.21 | 0.024000  | 0.000576 GRAV      |
| 5345 | 712809.698 | 504017.861 | 1270.14 | -0.024000 | 0.000576 ASPH      |
| 5373 | 711496.869 | 497826.089 | 1201.59 | -0.024000 | 0.000576 BRUSH     |
| 5413 | 675019.613 | 448243.880 | 733.44  | -0.024000 | 0.000576 ASPH      |
| 5420 | 675027.534 | 448241.528 | 733.32  | -0.024000 | 0.000576 ASPH      |
| 5669 | 700768.628 | 419607.595 | 728.23  | 0.025000  | 0.000625 GRAV      |
| 5067 | 610058.079 | 504733.602 | 806.09  | 0.026000  | 0.000676 TALL GRAS |
| 5191 | 620986.032 | 414862.390 | 1020.19 | -0.026000 | 0.000676 ASPH      |
| 5244 | 621762.171 | 424642.212 | 1125.19 | -0.026000 | 0.000676 GRAV      |
| 5693 | 700689.088 | 420083.442 | 723.59  | -0.026000 | 0.000676 ASPH      |
| 5359 | 711511.359 | 497833.501 | 1202.58 | 0.027000  | 0.000729 BRUSH     |
| 5487 | 675487.419 | 451260.137 | 735.11  | 0.027000  | 0.000729 GRAV      |
| 5608 | 713289.045 | 402675.426 | 715.54  | 0.027000  | 0.000729 LOW GRASS |
| 5144 | 605133.413 | 506402.350 | 767.14  | -0.028000 | 0.000784 TREE COVE |
| 5336 | 712809.524 | 504022.126 | 1270.27 | 0.029000  | 0.000841 ASPH      |
| 5496 | 675478.781 | 451263.884 | 735.32  | -0.029000 | 0.000841 GRAV      |
| 5086 | 600891.952 | 507835.213 | 767.86  | -0.030000 | 0.000900 ASPH      |
| 5200 | 620990.232 | 414863.350 | 1020.02 | 0.030000  | 0.000900 ASPH      |
| 5593 | 715022.905 | 402010.752 | 720.34  | -0.030000 | 0.000900 BRUSH     |
| 5192 | 620987.466 | 414857.872 | 1020.04 | -0.031000 | 0.000961 ASPH      |
| 5197 | 620994.134 | 414851.832 | 1019.54 | -0.031000 | 0.000961 ASPH      |
| 5278 | 712602.827 | 506601.117 | 1171.12 | -0.031000 | 0.000961 LOW GRASS |
| 5301 | 712860.183 | 504112.147 | 1272.46 | 0.032000  | 0.001024 TALL GRAS |
| 5494 | 675483.025 | 451259.727 | 735.22  | -0.032000 | 0.001024 GRAV      |
| 5410 | 675022.005 | 448236.261 | 733.40  | 0.033000  | 0.001089 ASPH      |
| 5658 | 700776.306 | 419611.649 | 728.42  | 0.033000  | 0.001089 GRAV      |
| 5062 | 610071.376 | 504719.851 | 806.24  | 0.034000  | 0.001156 TALL GRAS |
| 5479 | 675496.127 | 451251.989 | 735.14  | 0.034000  | 0.001156 GRAV      |
| 5483 | 675491.567 | 451255.385 | 735.14  | -0.034000 | 0.001156 GRAV      |
| 5179 | 620976.820 | 414846.575 | 1020.13 | 0.035000  | 0.001225 ASPH      |
| 5182 | 620980.770 | 414847.252 | 1020.04 | -0.035000 | 0.001225 ASPH      |
| 5408 | 675017.101 | 448241.486 | 733.46  | -0.035000 | 0.001225 ASPH      |
| 5576 | 715005.492 | 402001.541 | 720.81  | 0.035000  | 0.001225 BRUSH     |
| 5625 | 713303.164 | 402682.606 | 715.73  | 0.035000  | 0.001225 LOW GRASS |
| 5036 | 610377.214 | 503178.352 | 838.80  | -0.036000 | 0.001296 GRAV      |
| 5231 | 621771.569 | 424632.286 | 1124.85 | -0.036000 | 0.001296 GRAV      |

|      |            |            |         |           |                    |
|------|------------|------------|---------|-----------|--------------------|
| 5238 | 621765.126 | 424637.730 | 1124.99 | -0.036000 | 0.001296 GRAV      |
| 5650 | 714319.739 | 402144.709 | 718.48  | -0.036000 | 0.001296 TREE COVE |
| 5444 | 674825.509 | 448217.152 | 733.28  | -0.037000 | 0.001369 LOW GRASS |
| 5652 | 700779.938 | 419608.325 | 728.47  | 0.037000  | 0.001369 GRAV      |
| 5140 | 605129.561 | 506405.787 | 767.07  | 0.037000  | 0.001369 TREE COVE |
| 5176 | 620974.101 | 414858.041 | 1020.53 | -0.038000 | 0.001444 ASPH      |
| 5232 | 621767.486 | 424633.153 | 1124.84 | 0.038000  | 0.001444 GRAV      |
| 5343 | 712818.302 | 504018.151 | 1270.09 | -0.038000 | 0.001444 ASPH      |
| 5427 | 674825.918 | 448206.411 | 733.36  | -0.038000 | 0.001444 LOW GRASS |
| 5583 | 715013.994 | 402003.109 | 720.52  | -0.038000 | 0.001444 BRUSH     |
| 5653 | 700780.011 | 419611.799 | 728.51  | -0.038000 | 0.001444 GRAV      |
| 5664 | 700772.234 | 419614.763 | 728.32  | -0.038000 | 0.001444 GRAV      |
| 5378 | 721382.625 | 497428.553 | 1232.81 | 0.038000  | 0.001444 TREE COVE |
| 5403 | 675013.963 | 448238.945 | 733.53  | -0.039000 | 0.001521 ASPH      |
| 5432 | 674818.686 | 448209.789 | 733.19  | -0.039000 | 0.001521 LOW GRASS |
| 5054 | 610068.056 | 504740.518 | 806.19  | -0.040000 | 0.001600 TALL GRAS |
| 5541 | 674880.225 | 448782.748 | 734.56  | 0.040000  | 0.001600 TREE COVE |
| 5237 | 621761.509 | 424638.550 | 1125.01 | -0.041000 | 0.001681 GRAV      |
| 5245 | 621758.440 | 424643.230 | 1125.24 | -0.041000 | 0.001681 GRAV      |
| 5482 | 675491.599 | 451251.744 | 735.12  | -0.041000 | 0.001681 GRAV      |
| 5241 | 621773.678 | 424639.406 | 1125.07 | -0.042000 | 0.001764 GRAV      |
| 5409 | 675019.549 | 448238.783 | 733.47  | -0.042000 | 0.001764 ASPH      |
| 5685 | 700679.895 | 420091.685 | 723.48  | -0.042000 | 0.001764 ASPH      |
| 5185 | 620977.705 | 414859.816 | 1020.51 | -0.044000 | 0.001936 ASPH      |
| 5428 | 674822.550 | 448206.490 | 733.29  | 0.044000  | 0.001936 LOW GRASS |
| 5447 | 674826.004 | 448220.583 | 733.25  | 0.044000  | 0.001936 LOW GRASS |
| 5700 | 700693.680 | 420076.105 | 723.62  | -0.044000 | 0.001936 ASPH      |
| 5374 | 721368.872 | 497428.427 | 1233.21 | 0.044000  | 0.001936 TREE COVE |
| 5324 | 712872.447 | 504092.946 | 1271.65 | 0.045000  | 0.002025 TALL GRAS |
| 5659 | 700776.340 | 419608.408 | 728.44  | 0.045000  | 0.002025 GRAV      |
| 5692 | 700689.223 | 420079.728 | 723.61  | -0.045000 | 0.002025 ASPH      |
| 5586 | 715009.206 | 402008.727 | 720.37  | -0.046000 | 0.002116 BRUSH     |
| 5660 | 700776.402 | 419604.719 | 728.44  | 0.046000  | 0.002116 GRAV      |
| 5203 | 620883.593 | 414916.003 | 1031.82 | 0.047000  | 0.002209 LOW GRASS |
| 5655 | 700779.829 | 419619.105 | 728.39  | 0.047000  | 0.002209 GRAV      |
| 5550 | 674883.807 | 448784.589 | 734.57  | -0.047000 | 0.002209 TREE COVE |
| 5342 | 712821.947 | 504018.222 | 1270.04 | -0.048000 | 0.002304 ASPH      |
| 5344 | 712813.751 | 504018.030 | 1270.12 | 0.049000  | 0.002401 ASPH      |
| 5445 | 674829.135 | 448217.157 | 733.29  | 0.049000  | 0.002401 LOW GRASS |
| 5068 | 610063.679 | 504734.236 | 806.16  | -0.050000 | 0.002500 TALL GRAS |
| 5239 | 621768.464 | 424636.623 | 1124.89 | 0.050000  | 0.002500 GRAV      |
| 5622 | 713303.362 | 402670.712 | 715.62  | 0.050000  | 0.002500 LOW GRASS |
| 5087 | 600888.515 | 507834.265 | 767.83  | -0.051000 | 0.002601 ASPH      |
| 5107 | 604910.966 | 506457.408 | 764.85  | 0.051000  | 0.002601 BRUSH     |
| 5439 | 674818.811 | 448213.281 | 733.25  | 0.051000  | 0.002601 LOW GRASS |
| 5052 | 610057.769 | 504739.262 | 806.12  | 0.052000  | 0.002704 TALL GRAS |
| 5414 | 675016.947 | 448246.400 | 733.46  | -0.052000 | 0.002704 ASPH      |
| 5688 | 700684.757 | 420083.941 | 723.50  | -0.052000 | 0.002704 ASPH      |
| 5055 | 610072.941 | 504741.241 | 806.26  | -0.053000 | 0.002809 TALL GRAS |
| 5025 | 610372.738 | 503175.490 | 838.99  | -0.054000 | 0.002916 GRAV      |
| 5088 | 600888.508 | 507829.994 | 767.78  | -0.054000 | 0.002916 ASPH      |
| 5208 | 620882.374 | 414919.984 | 1031.94 | 0.054000  | 0.002916 LOW GRASS |
| 5242 | 621769.552 | 424640.580 | 1125.12 | -0.054000 | 0.002916 GRAV      |
| 5008 | 611795.245 | 498088.823 | 1035.96 | -0.056000 | 0.003136 LOW GRASS |
| 5215 | 620872.656 | 414922.507 | 1032.98 | 0.056000  | 0.003136 LOW GRASS |
| 5284 | 712604.340 | 506606.174 | 1171.05 | 0.056000  | 0.003136 LOW GRASS |
| 5323 | 712868.327 | 504093.350 | 1271.77 | 0.056000  | 0.003136 TALL GRAS |
| 5326 | 712809.972 | 504030.453 | 1270.43 | 0.056000  | 0.003136 ASPH      |
| 5513 | 679327.520 | 444154.564 | 798.87  | 0.056000  | 0.003136 BRUSH     |

|      |            |            |         |           |                    |
|------|------------|------------|---------|-----------|--------------------|
| 5604 | 713284.163 | 402671.816 | 715.54  | 0.056000  | 0.003136 LOW GRASS |
| 5615 | 713293.616 | 402683.289 | 715.65  | -0.056000 | 0.003136 LOW GRASS |
| 5065 | 610059.927 | 504722.945 | 806.22  | -0.057000 | 0.003249 TALL GRAS |
| 5488 | 675487.524 | 451256.203 | 735.13  | -0.058000 | 0.003364 GRAV      |
| 5049 | 610386.790 | 503192.469 | 837.97  | 0.059000  | 0.003481 GRAV      |
| 5093 | 600883.953 | 507820.092 | 767.59  | -0.059000 | 0.003481 ASPH      |
| 5102 | 604906.253 | 506476.518 | 764.94  | 0.059000  | 0.003481 BRUSH     |
| 5425 | 675020.810 | 448253.193 | 733.41  | -0.059000 | 0.003481 ASPH      |
| 5666 | 700768.161 | 419618.566 | 728.20  | 0.059000  | 0.003481 GRAV      |
| 5070 | 610072.706 | 504736.794 | 806.30  | -0.060000 | 0.003600 TALL GRAS |
| 5078 | 600897.512 | 507830.513 | 767.79  | 0.060000  | 0.003600 ASPH      |
| 5094 | 600884.001 | 507825.032 | 767.64  | -0.060000 | 0.003600 ASPH      |
| 5178 | 620976.111 | 414850.561 | 1020.25 | 0.060000  | 0.003600 ASPH      |
| 5437 | 674825.978 | 448213.605 | 733.27  | 0.060000  | 0.003600 LOW GRASS |
| 5618 | 713298.429 | 402674.599 | 715.70  | 0.060000  | 0.003600 LOW GRASS |
| 5372 | 711495.145 | 497845.669 | 1202.63 | 0.061000  | 0.003721 BRUSH     |
| 5114 | 604916.879 | 506466.158 | 764.90  | 0.062000  | 0.003844 BRUSH     |
| 5051 | 610383.254 | 503201.565 | 837.70  | -0.063000 | 0.003969 GRAV      |
| 5426 | 674829.447 | 448206.624 | 733.27  | 0.063000  | 0.003969 LOW GRASS |
| 5696 | 700693.162 | 420092.137 | 723.73  | 0.063000  | 0.003969 ASPH      |
| 5528 | 674872.148 | 448771.052 | 734.62  | -0.063000 | 0.003969 TREE COVE |
| 5063 | 610066.300 | 504718.796 | 806.18  | 0.064000  | 0.004096 TALL GRAS |
| 5311 | 712860.020 | 504102.797 | 1272.31 | -0.065000 | 0.004225 TALL GRAS |
| 5480 | 675496.188 | 451248.164 | 735.10  | -0.065000 | 0.004225 GRAV      |
| 5619 | 713298.340 | 402678.609 | 715.72  | 0.065000  | 0.004225 LOW GRASS |
| 5058 | 610078.494 | 504731.591 | 806.39  | -0.066000 | 0.004356 TALL GRAS |
| 5247 | 621763.256 | 424646.562 | 1125.22 | 0.066000  | 0.004356 GRAV      |
| 5369 | 711493.149 | 497831.463 | 1201.79 | -0.066000 | 0.004356 BRUSH     |
| 5546 | 674890.624 | 448771.685 | 734.47  | -0.066000 | 0.004356 TREE COVE |
| 5243 | 621766.036 | 424641.363 | 1125.15 | -0.067000 | 0.004489 GRAV      |
| 5293 | 712610.816 | 506614.886 | 1171.05 | -0.067000 | 0.004489 LOW GRASS |
| 5322 | 712864.378 | 504093.286 | 1271.92 | 0.067000  | 0.004489 TALL GRAS |
| 5424 | 675023.322 | 448250.800 | 733.39  | -0.067000 | 0.004489 ASPH      |
| 5398 | 721378.597 | 497445.704 | 1232.87 | -0.067000 | 0.004489 TREE COVE |
| 5084 | 600892.435 | 507826.469 | 767.74  | -0.068000 | 0.004624 ASPH      |
| 5446 | 674829.672 | 448220.689 | 733.24  | 0.068000  | 0.004624 LOW GRASS |
| 5582 | 715017.586 | 402002.024 | 720.44  | -0.068000 | 0.004624 BRUSH     |
| 5206 | 620874.040 | 414919.059 | 1032.84 | 0.069000  | 0.004761 LOW GRASS |
| 5515 | 679327.169 | 444146.901 | 799.13  | 0.069000  | 0.004761 BRUSH     |
| 5682 | 700680.305 | 420079.575 | 723.34  | -0.069000 | 0.004761 ASPH      |
| 5246 | 621759.494 | 424647.646 | 1125.28 | -0.070000 | 0.004900 GRAV      |
| 5667 | 700768.343 | 419614.917 | 728.18  | 0.070000  | 0.004900 GRAV      |
| 5476 | 675496.012 | 451264.071 | 735.20  | -0.071000 | 0.005041 GRAV      |
| 5654 | 700779.880 | 419615.320 | 728.44  | -0.071000 | 0.005041 GRAV      |
| 5585 | 715007.270 | 402004.711 | 720.81  | 0.072000  | 0.005184 BRUSH     |
| 5673 | 700764.617 | 419610.442 | 728.13  | 0.072000  | 0.005184 GRAV      |
| 5389 | 721383.124 | 497441.205 | 1232.85 | -0.072000 | 0.005184 TREE COVE |
| 5032 | 610369.928 | 503192.382 | 838.45  | -0.074000 | 0.005476 GRAV      |
| 5315 | 712876.690 | 504102.733 | 1271.91 | -0.074000 | 0.005476 TALL GRAS |
| 5559 | 701629.304 | 404476.742 | 711.47  | 0.074000  | 0.005476 TALL GRAS |
| 5614 | 713293.383 | 402679.322 | 715.66  | 0.074000  | 0.005476 LOW GRASS |
| 5316 | 712876.985 | 504097.571 | 1271.69 | 0.075000  | 0.005625 TALL GRAS |
| 5188 | 620983.943 | 414852.956 | 1020.06 | 0.076000  | 0.005776 ASPH      |
| 5209 | 620886.318 | 414920.585 | 1031.56 | 0.076000  | 0.005776 LOW GRASS |
| 5492 | 675483.102 | 451251.702 | 735.19  | -0.076000 | 0.005776 GRAV      |
| 5676 | 700675.329 | 420091.817 | 723.37  | -0.076000 | 0.005776 ASPH      |
| 5689 | 700684.759 | 420079.560 | 723.49  | -0.076000 | 0.005776 ASPH      |
| 5592 | 715025.271 | 402008.519 | 720.62  | -0.078000 | 0.006084 BRUSH     |
| 5626 | 714304.157 | 402133.867 | 718.76  | -0.078000 | 0.006084 TREE COVE |



|      |            |            |         |           |                    |
|------|------------|------------|---------|-----------|--------------------|
| 5321 | 712860.014 | 504093.428 | 1272.10 | -0.079000 | 0.006241 TALL GRAS |
| 5211 | 620889.242 | 414925.761 | 1031.31 | 0.080000  | 0.006400 LOW GRASS |
| 5621 | 713303.370 | 402667.500 | 715.66  | -0.080000 | 0.006400 LOW GRASS |
| 5335 | 712809.570 | 504026.130 | 1270.37 | -0.081000 | 0.006561 ASPH      |
| 5404 | 675011.409 | 448241.527 | 733.54  | -0.081000 | 0.006561 ASPH      |
| 5431 | 674815.270 | 448209.820 | 733.22  | 0.081000  | 0.006561 LOW GRASS |
| 5607 | 713289.101 | 402671.751 | 715.57  | 0.081000  | 0.006561 LOW GRASS |
| 5684 | 700680.139 | 420087.757 | 723.45  | -0.081000 | 0.006561 ASPH      |
| 5210 | 620889.995 | 414921.198 | 1031.22 | 0.082000  | 0.006724 LOW GRASS |
| 5558 | 701629.386 | 404480.574 | 711.35  | 0.082000  | 0.006724 TALL GRAS |
| 5234 | 621760.205 | 424634.348 | 1124.91 | -0.083000 | 0.006889 GRAV      |
| 5683 | 700680.029 | 420083.388 | 723.40  | -0.083000 | 0.006889 ASPH      |
| 5531 | 674872.524 | 448778.973 | 734.70  | -0.083000 | 0.006889 TREE COVE |
| 5177 | 620975.141 | 414854.343 | 1020.42 | -0.084000 | 0.007056 ASPH      |
| 5196 | 620995.129 | 414847.495 | 1019.52 | -0.084000 | 0.007056 ASPH      |
| 5198 | 620992.577 | 414855.816 | 1019.66 | 0.084000  | 0.007056 ASPH      |
| 5477 | 675495.933 | 451259.986 | 735.12  | 0.084000  | 0.007056 GRAV      |
| 5553 | 701633.314 | 404480.801 | 711.45  | 0.084000  | 0.007056 TALL GRAS |
| 5183 | 620979.588 | 414851.500 | 1020.21 | -0.085000 | 0.007225 ASPH      |
| 5282 | 712612.589 | 506605.171 | 1171.83 | -0.085000 | 0.007225 LOW GRASS |
| 5287 | 712605.124 | 506610.366 | 1170.92 | -0.085000 | 0.007225 LOW GRASS |
| 5548 | 674887.174 | 448778.050 | 734.50  | -0.085000 | 0.007225 TREE COVE |
| 5317 | 712872.565 | 504097.809 | 1271.73 | 0.086000  | 0.007396 TALL GRAS |
| 5340 | 712825.632 | 504022.031 | 1270.06 | 0.086000  | 0.007396 ASPH      |
| 5657 | 700776.076 | 419615.305 | 728.39  | 0.086000  | 0.007396 GRAV      |
| 5279 | 712607.996 | 506600.896 | 1171.57 | -0.087000 | 0.007569 LOW GRASS |
| 5405 | 675008.941 | 448244.068 | 733.57  | -0.087000 | 0.007569 ASPH      |
| 5596 | 715018.836 | 402012.122 | 720.28  | -0.087000 | 0.007569 BRUSH     |
| 5069 | 610068.178 | 504735.590 | 806.27  | -0.088000 | 0.007744 TALL GRAS |
| 5497 | 675478.895 | 451259.625 | 735.30  | -0.088000 | 0.007744 GRAV      |
| 5076 | 610069.718 | 504729.392 | 806.20  | -0.089000 | 0.007921 TALL GRAS |
| 5599 | 715012.218 | 402015.023 | 720.37  | -0.089000 | 0.007921 BRUSH     |
| 5697 | 700693.465 | 420088.159 | 723.73  | -0.089000 | 0.007921 ASPH      |
| 5145 | 605137.289 | 506402.085 | 766.85  | 0.089000  | 0.007921 TREE COVE |
| 5180 | 620978.429 | 414842.670 | 1020.02 | -0.090000 | 0.008100 ASPH      |
| 5489 | 675487.398 | 451251.846 | 735.13  | -0.090000 | 0.008100 GRAV      |
| 5589 | 715018.993 | 402005.979 | 720.54  | -0.090000 | 0.008100 BRUSH     |
| 5538 | 674880.389 | 448774.452 | 734.49  | -0.090000 | 0.008100 TREE COVE |
| 5043 | 610380.947 | 503195.473 | 838.00  | -0.091000 | 0.008281 GRAV      |
| 5077 | 600897.831 | 507834.745 | 767.82  | 0.091000  | 0.008281 ASPH      |
| 5563 | 701625.103 | 404480.580 | 711.22  | 0.091000  | 0.008281 TALL GRAS |
| 5081 | 600897.959 | 507815.093 | 767.52  | -0.092000 | 0.008464 ASPH      |
| 5297 | 712607.898 | 506619.320 | 1170.74 | -0.092000 | 0.008464 LOW GRASS |
| 5330 | 712825.032 | 504030.770 | 1270.24 | 0.092000  | 0.008464 ASPH      |
| 5190 | 620986.436 | 414844.953 | 1019.77 | -0.094000 | 0.008836 ASPH      |
| 5294 | 712606.571 | 506615.410 | 1170.71 | -0.094000 | 0.008836 LOW GRASS |
| 5433 | 674822.074 | 448210.074 | 733.26  | 0.094000  | 0.008836 LOW GRASS |
| 5434 | 674825.544 | 448209.974 | 733.28  | 0.094000  | 0.008836 LOW GRASS |
| 5491 | 675482.865 | 451247.640 | 735.19  | -0.095000 | 0.009025 GRAV      |
| 5402 | 675016.669 | 448236.189 | 733.48  | -0.096000 | 0.009216 ASPH      |
| 5421 | 675029.887 | 448243.635 | 733.36  | -0.096000 | 0.009216 ASPH      |
| 5079 | 600897.719 | 507824.660 | 767.68  | -0.097000 | 0.009409 ASPH      |
| 5227 | 621758.817 | 424630.147 | 1124.74 | -0.097000 | 0.009409 GRAV      |
| 5385 | 721370.888 | 497436.370 | 1233.19 | -0.098000 | 0.009604 TREE COVE |
| 5310 | 712860.424 | 504107.048 | 1272.31 | 0.099000  | 0.009801 TALL GRAS |
| 5499 | 675479.052 | 451252.083 | 735.24  | -0.099000 | 0.009801 GRAV      |
| 5397 | 721376.601 | 497445.581 | 1232.96 | -0.099000 | 0.009801 TREE COVE |
| 5212 | 620884.897 | 414924.960 | 1031.59 | 0.100000  | 0.010000 LOW GRASS |
| 5670 | 700768.901 | 419604.120 | 728.27  | 0.100000  | 0.010000 GRAV      |

|      |            |            |         |           |                    |
|------|------------|------------|---------|-----------|--------------------|
| 5694 | 700688.792 | 420088.106 | 723.63  | -0.100000 | 0.010000 ASPH      |
| 5143 | 605130.028 | 506402.172 | 767.22  | -0.100000 | 0.010000 TREE COVE |
| 5235 | 621756.524 | 424634.797 | 1124.96 | -0.101000 | 0.010201 GRAV      |
| 5674 | 700764.494 | 419614.130 | 728.09  | 0.101000  | 0.010201 GRAV      |
| 5500 | 675478.987 | 451247.843 | 735.24  | -0.102000 | 0.010404 GRAV      |
| 5600 | 715010.697 | 402011.567 | 720.22  | -0.102000 | 0.010404 BRUSH     |
| 5376 | 721375.023 | 497428.657 | 1233.03 | 0.102000  | 0.010404 TREE COVE |
| 5298 | 712611.872 | 506618.896 | 1170.96 | -0.103000 | 0.010609 LOW GRASS |
| 5318 | 712868.527 | 504097.473 | 1271.81 | 0.103000  | 0.010609 TALL GRAS |
| 5407 | 675014.345 | 448243.993 | 733.48  | -0.104000 | 0.010816 ASPH      |
| 5665 | 700772.041 | 419618.976 | 728.26  | 0.104000  | 0.010816 GRAV      |
| 5687 | 700684.720 | 420088.160 | 723.54  | -0.104000 | 0.010816 ASPH      |
| 5529 | 674870.538 | 448774.396 | 734.65  | -0.104000 | 0.010816 TREE COVE |
| 5661 | 700772.779 | 419604.250 | 728.37  | 0.105000  | 0.011025 GRAV      |
| 5308 | 712868.618 | 504107.560 | 1272.12 | 0.107000  | 0.011449 TALL GRAS |
| 5347 | 712813.644 | 504013.703 | 1269.96 | -0.107000 | 0.011449 ASPH      |
| 5350 | 712825.317 | 504014.171 | 1269.85 | -0.107000 | 0.011449 ASPH      |
| 5574 | 701616.941 | 404483.734 | 711.20  | 0.107000  | 0.011449 TALL GRAS |
| 5590 | 715022.078 | 402003.025 | 720.62  | -0.108000 | 0.011664 BRUSH     |
| 5698 | 700693.612 | 420084.528 | 723.76  | -0.108000 | 0.011664 ASPH      |
| 5337 | 712813.578 | 504021.969 | 1270.23 | -0.109000 | 0.011881 ASPH      |
| 5368 | 711491.771 | 497826.698 | 1201.63 | -0.109000 | 0.011881 BRUSH     |
| 5534 | 674878.052 | 448769.536 | 734.53  | -0.109000 | 0.011881 TREE COVE |
| 5642 | 714316.236 | 402142.240 | 718.53  | -0.109000 | 0.011881 TREE COVE |
| 5319 | 712864.336 | 504097.378 | 1272.00 | 0.110000  | 0.012100 TALL GRAS |
| 5610 | 713289.043 | 402682.561 | 715.59  | 0.110000  | 0.012100 LOW GRASS |
| 5627 | 714307.538 | 402133.693 | 718.78  | 0.110000  | 0.012100 TREE COVE |
| 5631 | 714317.165 | 402136.334 | 718.78  | 0.110000  | 0.012100 TREE COVE |
| 5649 | 714317.979 | 402144.720 | 718.53  | -0.110000 | 0.012100 TREE COVE |
| 5329 | 712821.451 | 504030.778 | 1270.30 | 0.112000  | 0.012544 ASPH      |
| 5554 | 701633.117 | 404484.412 | 711.41  | 0.112000  | 0.012544 TALL GRAS |
| 5567 | 701621.332 | 404484.015 | 711.25  | 0.112000  | 0.012544 TALL GRAS |
| 5645 | 714306.596 | 402144.414 | 718.49  | -0.112000 | 0.012544 TREE COVE |
| 5300 | 712620.679 | 506616.736 | 1171.73 | -0.113000 | 0.012769 LOW GRASS |
| 5423 | 675025.574 | 448248.290 | 733.37  | -0.114000 | 0.012996 ASPH      |
| 5142 | 605126.031 | 506402.641 | 767.19  | -0.114000 | 0.012996 TREE COVE |
| 5189 | 620985.238 | 414849.001 | 1019.93 | -0.115000 | 0.013225 ASPH      |
| 5050 | 610385.027 | 503197.190 | 837.83  | -0.116000 | 0.013456 GRAV      |
| 5118 | 604922.258 | 506462.237 | 765.11  | 0.117000  | 0.013689 BRUSH     |
| 5224 | 620873.320 | 414931.717 | 1032.81 | 0.117000  | 0.013689 LOW GRASS |
| 5346 | 712809.521 | 504013.585 | 1269.99 | -0.117000 | 0.013689 ASPH      |
| 5602 | 713283.865 | 402678.993 | 715.51  | 0.118000  | 0.013924 LOW GRASS |
| 5605 | 713284.331 | 402667.999 | 715.54  | 0.118000  | 0.013924 LOW GRASS |
| 5090 | 600888.646 | 507820.613 | 767.69  | -0.119000 | 0.014161 ASPH      |
| 5213 | 620880.711 | 414924.162 | 1032.04 | 0.119000  | 0.014161 LOW GRASS |
| 5556 | 701629.491 | 404488.401 | 711.29  | 0.119000  | 0.014161 TALL GRAS |
| 5549 | 674885.489 | 448781.435 | 734.54  | -0.119000 | 0.014161 TREE COVE |
| 5490 | 675487.434 | 451247.866 | 735.19  | -0.120000 | 0.014400 GRAV      |
| 5677 | 700675.492 | 420087.839 | 723.34  | -0.121000 | 0.014641 ASPH      |
| 5429 | 674819.098 | 448206.301 | 733.22  | 0.122000  | 0.014884 LOW GRASS |
| 5139 | 605132.811 | 506405.177 | 766.93  | 0.123000  | 0.015129 TREE COVE |
| 5150 | 605134.178 | 506421.720 | 766.71  | -0.123000 | 0.015129 TREE COVE |
| 5184 | 620978.912 | 414855.432 | 1020.35 | -0.125000 | 0.015625 ASPH      |
| 5288 | 712609.721 | 506610.164 | 1171.27 | -0.125000 | 0.015625 LOW GRASS |
| 5289 | 712613.880 | 506609.132 | 1171.72 | -0.125000 | 0.015625 LOW GRASS |
| 5620 | 713298.297 | 402682.713 | 715.68  | 0.125000  | 0.015625 LOW GRASS |
| 5675 | 700764.374 | 419618.207 | 728.08  | 0.125000  | 0.015625 GRAV      |
| 5691 | 700689.318 | 420076.059 | 723.60  | -0.125000 | 0.015625 ASPH      |
| 5031 | 610368.351 | 503196.229 | 838.28  | -0.126000 | 0.015876 GRAV      |

|      |            |            |         |           |                    |
|------|------------|------------|---------|-----------|--------------------|
| 5061 | 610075.406 | 504721.120 | 806.40  | -0.126000 | 0.015876 TALL GRAS |
| 5386 | 721375.096 | 497436.739 | 1233.05 | -0.126000 | 0.015876 TREE COVE |
| 5204 | 620879.707 | 414915.243 | 1032.12 | 0.127000  | 0.016129 LOW GRASS |
| 5430 | 674815.619 | 448206.125 | 733.21  | 0.127000  | 0.016129 LOW GRASS |
| 5391 | 721375.701 | 497440.688 | 1233.02 | -0.127000 | 0.016129 TREE COVE |
| 5356 | 711511.658 | 497844.973 | 1203.40 | -0.128000 | 0.016384 BRUSH     |
| 5510 | 679331.390 | 444161.484 | 798.79  | 0.128000  | 0.016384 BRUSH     |
| 5591 | 715024.286 | 402005.739 | 720.64  | -0.128000 | 0.016384 BRUSH     |
| 5255 | 621456.349 | 423747.975 | 1130.90 | 0.129000  | 0.016641 BRUSH     |
| 5299 | 712616.190 | 506618.023 | 1171.27 | -0.129000 | 0.016641 LOW GRASS |
| 5690 | 700685.053 | 420075.540 | 723.50  | -0.129000 | 0.016641 ASPH      |
| 5530 | 674869.238 | 448777.525 | 734.72  | -0.129000 | 0.016641 TREE COVE |
| 5056 | 610076.803 | 504741.865 | 806.31  | -0.130000 | 0.016900 TALL GRAS |
| 5216 | 620871.181 | 414927.106 | 1033.12 | 0.130000  | 0.016900 LOW GRASS |
| 5312 | 712864.818 | 504102.464 | 1272.11 | 0.130000  | 0.016900 TALL GRAS |
| 5587 | 715012.356 | 402007.947 | 720.25  | 0.130000  | 0.016900 BRUSH     |
| 5292 | 712615.084 | 506613.950 | 1171.42 | -0.131000 | 0.017161 LOW GRASS |
| 5028 | 610367.024 | 503188.240 | 838.75  | -0.132000 | 0.017424 GRAV      |
| 5220 | 620887.247 | 414930.648 | 1031.42 | 0.132000  | 0.017424 LOW GRASS |
| 5594 | 715020.753 | 402008.461 | 720.50  | -0.132000 | 0.017424 BRUSH     |
| 5390 | 721379.697 | 497440.823 | 1233.03 | -0.132000 | 0.017424 TREE COVE |
| 5009 | 611798.888 | 498090.000 | 1036.12 | -0.133000 | 0.017689 LOW GRASS |
| 5181 | 620982.270 | 414843.195 | 1019.93 | -0.133000 | 0.017689 ASPH      |
| 5066 | 610059.003 | 504727.347 | 806.13  | -0.134000 | 0.017956 TALL GRAS |
| 5221 | 620885.982 | 414934.971 | 1031.46 | 0.134000  | 0.017956 LOW GRASS |
| 5486 | 675487.396 | 451264.356 | 735.22  | -0.134000 | 0.017956 GRAV      |
| 5562 | 701624.810 | 404476.879 | 711.26  | 0.135000  | 0.018225 TALL GRAS |
| 5570 | 701621.061 | 404472.203 | 711.15  | 0.135000  | 0.018225 TALL GRAS |
| 5214 | 620877.088 | 414923.320 | 1032.35 | 0.136000  | 0.018496 LOW GRASS |
| 5226 | 621754.878 | 424630.891 | 1124.72 | -0.136000 | 0.018496 GRAV      |
| 5516 | 679323.243 | 444147.015 | 799.09  | 0.136000  | 0.018496 BRUSH     |
| 5399 | 721381.905 | 497445.568 | 1232.90 | -0.136000 | 0.018496 TREE COVE |
| 5443 | 674822.371 | 448217.282 | 733.25  | 0.137000  | 0.018769 LOW GRASS |
| 5686 | 700684.599 | 420091.971 | 723.57  | -0.137000 | 0.018769 ASPH      |
| 5105 | 604906.088 | 506462.758 | 764.75  | 0.139000  | 0.019321 BRUSH     |
| 5442 | 674818.958 | 448217.083 | 733.27  | 0.139000  | 0.019321 LOW GRASS |
| 5320 | 712859.932 | 504097.562 | 1272.16 | 0.140000  | 0.019600 TALL GRAS |
| 5551 | 701632.955 | 404473.585 | 711.59  | 0.140000  | 0.019600 TALL GRAS |
| 5565 | 701625.077 | 404487.653 | 711.28  | 0.141000  | 0.019881 TALL GRAS |
| 5539 | 674878.435 | 448777.781 | 734.62  | -0.141000 | 0.019881 TREE COVE |
| 5630 | 714316.804 | 402132.559 | 718.92  | 0.141000  | 0.019881 TREE COVE |
| 5314 | 712872.345 | 504102.757 | 1271.98 | -0.143000 | 0.020449 TALL GRAS |
| 5560 | 701629.261 | 404472.952 | 711.53  | 0.143000  | 0.020449 TALL GRAS |
| 5533 | 674876.250 | 448772.967 | 734.56  | -0.143000 | 0.020449 TREE COVE |
| 5059 | 610079.608 | 504726.979 | 806.47  | -0.145000 | 0.021025 TALL GRAS |
| 5406 | 675011.680 | 448246.759 | 733.51  | -0.145000 | 0.021025 ASPH      |
| 5354 | 711507.890 | 497840.966 | 1203.05 | -0.147000 | 0.021609 BRUSH     |
| 5523 | 679319.589 | 444157.802 | 798.58  | 0.147000  | 0.021609 BRUSH     |
| 5568 | 701621.321 | 404480.216 | 711.13  | 0.147000  | 0.021609 TALL GRAS |
| 5532 | 674874.459 | 448775.892 | 734.61  | -0.147000 | 0.021609 TREE COVE |
| 5526 | 674874.911 | 448764.853 | 734.56  | -0.148000 | 0.021904 TREE COVE |
| 5002 | 611792.224 | 498082.552 | 1036.01 | -0.149000 | 0.022201 LOW GRASS |
| 5671 | 700764.995 | 419603.698 | 728.24  | 0.149000  | 0.022201 GRAV      |
| 5695 | 700689.127 | 420092.026 | 723.67  | -0.149000 | 0.022201 ASPH      |
| 5641 | 714319.150 | 402141.741 | 718.51  | -0.149000 | 0.022201 TREE COVE |
| 5046 | 610385.868 | 503181.328 | 838.44  | -0.150000 | 0.022500 GRAV      |
| 5103 | 604906.207 | 506471.633 | 764.82  | 0.151000  | 0.022801 BRUSH     |
| 5339 | 712822.000 | 504022.259 | 1270.12 | 0.152000  | 0.023104 ASPH      |
| 5450 | 674815.224 | 448220.563 | 733.37  | 0.152000  | 0.023104 LOW GRASS |

|      |            |            |         |           |                    |
|------|------------|------------|---------|-----------|--------------------|
| 5598 | 715015.471 | 402014.111 | 720.38  | -0.152000 | 0.023104 BRUSH     |
| 5113 | 604916.356 | 506471.608 | 764.95  | 0.153000  | 0.023409 BRUSH     |
| 5597 | 715014.326 | 402011.102 | 720.36  | -0.153000 | 0.023409 BRUSH     |
| 5517 | 679323.337 | 444150.336 | 798.99  | 0.154000  | 0.023716 BRUSH     |
| 5521 | 679324.087 | 444154.350 | 798.80  | 0.154000  | 0.023716 BRUSH     |
| 5030 | 610363.773 | 503194.912 | 838.54  | -0.155000 | 0.024025 GRAV      |
| 5525 | 679323.386 | 444161.226 | 798.65  | 0.155000  | 0.024025 BRUSH     |
| 5588 | 715015.466 | 402006.796 | 720.25  | 0.155000  | 0.024025 BRUSH     |
| 5024 | 611778.076 | 498097.066 | 1034.67 | -0.156000 | 0.024336 LOW GRASS |
| 5035 | 610375.176 | 503181.726 | 838.76  | -0.156000 | 0.024336 GRAV      |
| 5121 | 604922.043 | 506476.367 | 765.14  | 0.156000  | 0.024336 BRUSH     |
| 5542 | 674881.706 | 448779.693 | 734.63  | -0.156000 | 0.024336 TREE COVE |
| 5138 | 605136.879 | 506404.975 | 767.06  | -0.157000 | 0.024649 TREE COVE |
| 5004 | 611784.920 | 498079.700 | 1035.67 | -0.158000 | 0.024964 LOW GRASS |
| 5352 | 711507.670 | 497832.697 | 1202.77 | -0.158000 | 0.024964 BRUSH     |
| 5485 | 675491.767 | 451264.217 | 735.19  | -0.159000 | 0.025281 GRAV      |
| 5132 | 605142.579 | 506412.778 | 766.82  | -0.159000 | 0.025281 TREE COVE |
| 5280 | 712611.926 | 506600.555 | 1171.99 | -0.160000 | 0.025600 LOW GRASS |
| 5603 | 713283.928 | 402675.227 | 715.44  | 0.161000  | 0.025921 LOW GRASS |
| 5296 | 712603.522 | 506620.703 | 1170.33 | -0.162000 | 0.026244 LOW GRASS |
| 5566 | 701621.307 | 404487.889 | 711.25  | 0.162000  | 0.026244 TALL GRAS |
| 5007 | 611790.872 | 498087.182 | 1035.84 | -0.163000 | 0.026569 LOW GRASS |
| 5029 | 610365.414 | 503192.003 | 838.63  | -0.163000 | 0.026569 GRAV      |
| 5261 | 621456.850 | 423755.245 | 1130.63 | 0.163000  | 0.026569 BRUSH     |
| 5555 | 701633.340 | 404488.152 | 711.31  | 0.163000  | 0.026569 TALL GRAS |
| 5123 | 604926.942 | 506471.446 | 765.16  | 0.164000  | 0.026896 BRUSH     |
| 5327 | 712813.819 | 504030.567 | 1270.40 | 0.165000  | 0.027225 ASPH      |
| 5370 | 711493.456 | 497836.518 | 1202.10 | -0.165000 | 0.027225 BRUSH     |
| 5662 | 700772.711 | 419607.714 | 728.33  | 0.165000  | 0.027225 GRAV      |
| 5217 | 620874.953 | 414927.829 | 1032.64 | 0.166000  | 0.027556 LOW GRASS |
| 5540 | 674876.325 | 448781.009 | 734.67  | -0.166000 | 0.027556 TREE COVE |
| 5048 | 610388.470 | 503187.687 | 838.09  | -0.167000 | 0.027889 GRAV      |
| 5281 | 712617.162 | 506604.810 | 1172.23 | -0.167000 | 0.027889 LOW GRASS |
| 5045 | 610384.393 | 503185.769 | 838.27  | -0.168000 | 0.028224 GRAV      |
| 5511 | 679327.182 | 444161.802 | 798.67  | 0.168000  | 0.028224 BRUSH     |
| 5569 | 701621.225 | 404476.224 | 711.04  | 0.168000  | 0.028224 TALL GRAS |
| 5109 | 604911.214 | 506466.558 | 764.80  | 0.169000  | 0.028561 BRUSH     |
| 5481 | 675491.537 | 451247.895 | 735.20  | -0.169000 | 0.028561 GRAV      |
| 5680 | 700675.901 | 420075.953 | 723.29  | -0.169000 | 0.028561 ASPH      |
| 5207 | 620878.225 | 414919.515 | 1032.31 | 0.170000  | 0.028900 LOW GRASS |
| 5124 | 604927.467 | 506466.738 | 765.04  | 0.172000  | 0.029584 BRUSH     |
| 5256 | 621456.501 | 423751.258 | 1130.72 | 0.172000  | 0.029584 BRUSH     |
| 5348 | 712817.982 | 504013.737 | 1269.90 | 0.172000  | 0.029584 ASPH      |
| 5082 | 600894.055 | 507815.172 | 767.57  | -0.173000 | 0.029929 ASPH      |
| 5092 | 600883.823 | 507815.327 | 767.50  | -0.173000 | 0.029929 ASPH      |
| 5137 | 605140.995 | 506404.637 | 766.94  | -0.173000 | 0.029929 TREE COVE |
| 5010 | 611797.080 | 498094.316 | 1035.95 | -0.174000 | 0.030276 LOW GRASS |
| 5419 | 675025.097 | 448243.962 | 733.35  | -0.175000 | 0.030625 ASPH      |
| 5571 | 701616.755 | 404472.161 | 711.04  | 0.175000  | 0.030625 TALL GRAS |
| 5219 | 620882.798 | 414929.996 | 1031.76 | 0.176000  | 0.030976 LOW GRASS |
| 5222 | 620881.177 | 414934.118 | 1031.94 | 0.176000  | 0.030976 LOW GRASS |
| 5518 | 679319.750 | 444150.890 | 798.86  | 0.176000  | 0.030976 BRUSH     |
| 5263 | 621452.533 | 423760.125 | 1131.15 | 0.177000  | 0.031329 BRUSH     |
| 5126 | 604927.129 | 506456.487 | 764.93  | 0.178000  | 0.031684 BRUSH     |
| 5218 | 620878.950 | 414928.726 | 1032.20 | 0.179000  | 0.032041 LOW GRASS |
| 5639 | 714315.175 | 402138.776 | 718.75  | -0.181000 | 0.032761 TREE COVE |
| 5557 | 701629.435 | 404484.564 | 711.32  | 0.182000  | 0.033124 TALL GRAS |
| 5561 | 701624.818 | 404472.830 | 711.19  | 0.183000  | 0.033489 TALL GRAS |
| 5580 | 715018.943 | 401997.427 | 720.68  | -0.183000 | 0.033489 BRUSH     |

|      |            |            |         |           |          |           |
|------|------------|------------|---------|-----------|----------|-----------|
| 5136 | 605128.252 | 506413.466 | 767.02  | -0.185000 | 0.034225 | TREE COVE |
| 5584 | 715011.233 | 402004.750 | 720.55  | 0.186000  | 0.034596 | BRUSH     |
| 5679 | 700675.765 | 420079.660 | 723.30  | -0.186000 | 0.034596 | ASPH      |
| 5394 | 721366.198 | 497445.840 | 1233.24 | -0.186000 | 0.034596 | TREE COVE |
| 5545 | 674886.732 | 448770.012 | 734.43  | -0.188000 | 0.035344 | TREE COVE |
| 5544 | 674885.024 | 448773.140 | 734.45  | -0.189000 | 0.035721 | TREE COVE |
| 5412 | 675022.183 | 448241.396 | 733.41  | -0.190000 | 0.036100 | ASPH      |
| 5519 | 679319.251 | 444146.530 | 799.01  | 0.191000  | 0.036481 | BRUSH     |
| 5573 | 701617.264 | 404480.279 | 711.09  | 0.192000  | 0.036864 | TALL GRAS |
| 5148 | 605143.291 | 506421.451 | 766.82  | -0.192000 | 0.036864 | TREE COVE |
| 5286 | 712600.611 | 506611.403 | 1170.64 | -0.193000 | 0.037249 | LOW GRASS |
| 5225 | 620869.353 | 414931.115 | 1033.20 | 0.194000  | 0.037636 | LOW GRASS |
| 5042 | 610379.040 | 503200.063 | 837.87  | -0.195000 | 0.038025 | GRAV      |
| 5097 | 600879.539 | 507834.745 | 767.54  | -0.195000 | 0.038025 | ASPH      |
| 5000 | 611800.421 | 498085.885 | 1036.36 | -0.196000 | 0.038416 | LOW GRASS |
| 5073 | 610070.377 | 504725.123 | 806.25  | -0.196000 | 0.038416 | TALL GRAS |
| 5379 | 721383.381 | 497432.436 | 1232.83 | -0.196000 | 0.038416 | TREE COVE |
| 5201 | 620891.881 | 414917.053 | 1030.94 | 0.197000  | 0.038809 | LOW GRASS |
| 5384 | 721367.232 | 497436.496 | 1233.41 | -0.197000 | 0.038809 | TREE COVE |
| 5681 | 700680.489 | 420076.051 | 723.38  | -0.198000 | 0.039204 | ASPH      |
| 5202 | 620887.842 | 414916.541 | 1031.26 | 0.199000  | 0.039601 | LOW GRASS |
| 5295 | 712602.148 | 506615.950 | 1170.44 | -0.200000 | 0.040000 | LOW GRASS |
| 5306 | 712876.547 | 504107.867 | 1271.87 | 0.200000  | 0.040000 | TALL GRAS |
| 5388 | 721383.637 | 497436.875 | 1232.92 | -0.200000 | 0.040000 | TREE COVE |
| 5071 | 610073.766 | 504731.138 | 806.33  | -0.201000 | 0.040401 | TALL GRAS |
| 5101 | 600879.323 | 507815.495 | 767.31  | -0.201000 | 0.040401 | ASPH      |
| 5057 | 610077.963 | 504736.384 | 806.40  | -0.203000 | 0.041209 | TALL GRAS |
| 5355 | 711507.558 | 497845.277 | 1203.22 | -0.203000 | 0.041209 | BRUSH     |
| 5089 | 600888.641 | 507825.101 | 767.73  | -0.204000 | 0.041616 | ASPH      |
| 5005 | 611783.235 | 498083.979 | 1035.43 | -0.205000 | 0.042025 | LOW GRASS |
| 5040 | 610375.631 | 503192.589 | 838.35  | -0.206000 | 0.042436 | GRAV      |
| 5060 | 610080.708 | 504722.708 | 806.55  | -0.207000 | 0.042849 | TALL GRAS |
| 5303 | 712868.367 | 504111.737 | 1272.21 | 0.207000  | 0.042849 | TALL GRAS |
| 5448 | 674822.423 | 448220.555 | 733.22  | 0.207000  | 0.042849 | LOW GRASS |
| 5127 | 605129.349 | 506409.483 | 767.07  | -0.207000 | 0.042849 | TREE COVE |
| 5535 | 674879.238 | 448766.378 | 734.51  | -0.207000 | 0.042849 | TREE COVE |
| 5503 | 679335.172 | 444154.455 | 798.75  | 0.208000  | 0.043264 | BRUSH     |
| 5552 | 701633.018 | 404477.217 | 711.50  | 0.208000  | 0.043264 | TALL GRAS |
| 5537 | 674881.854 | 448771.041 | 734.46  | -0.208000 | 0.043264 | TREE COVE |
| 5223 | 620877.167 | 414932.923 | 1032.36 | 0.209000  | 0.043681 | LOW GRASS |
| 5135 | 605130.846 | 506413.214 | 766.96  | -0.209000 | 0.043681 | TREE COVE |
| 5290 | 712618.141 | 506608.485 | 1172.06 | -0.211000 | 0.044521 | LOW GRASS |
| 5396 | 721374.159 | 497445.559 | 1233.04 | -0.211000 | 0.044521 | TREE COVE |
| 5037 | 610381.366 | 503179.626 | 838.63  | -0.212000 | 0.044944 | GRAV      |
| 5072 | 610074.650 | 504726.301 | 806.40  | -0.212000 | 0.044944 | TALL GRAS |
| 5634 | 714306.878 | 402137.837 | 718.54  | -0.212000 | 0.044944 | TREE COVE |
| 5120 | 604922.411 | 506471.922 | 765.14  | 0.214000  | 0.045796 | BRUSH     |
| 5564 | 701625.229 | 404484.056 | 711.19  | 0.214000  | 0.045796 | TALL GRAS |
| 5033 | 610371.378 | 503188.797 | 838.60  | -0.215000 | 0.046225 | GRAV      |
| 5441 | 674815.206 | 448217.052 | 733.20  | 0.217000  | 0.047089 | LOW GRASS |
| 5141 | 605126.136 | 506405.847 | 767.15  | -0.217000 | 0.047089 | TREE COVE |
| 5629 | 714313.408 | 402132.928 | 719.05  | 0.217000  | 0.047089 | TREE COVE |
| 5038 | 610379.212 | 503184.128 | 838.61  | -0.218000 | 0.047524 | GRAV      |
| 5575 | 701616.906 | 404487.821 | 711.21  | 0.218000  | 0.047524 | TALL GRAS |
| 5161 | 612614.083 | 414908.785 | 683.26  | 0.219000  | 0.047961 | TALL GRAS |
| 5075 | 610064.519 | 504727.923 | 806.17  | -0.221000 | 0.048841 | TALL GRAS |
| 5006 | 611787.334 | 498085.690 | 1035.75 | -0.223000 | 0.049729 | LOW GRASS |
| 5304 | 712872.161 | 504112.057 | 1272.08 | 0.223000  | 0.049729 | TALL GRAS |
| 5595 | 715017.228 | 402009.457 | 720.54  | -0.223000 | 0.049729 | BRUSH     |

|      |            |            |         |           |                    |
|------|------------|------------|---------|-----------|--------------------|
| 5514 | 679327.233 | 444151.106 | 798.89  | 0.225000  | 0.050625 BRUSH     |
| 5041 | 610373.136 | 503197.144 | 838.20  | -0.226000 | 0.051076 GRAV      |
| 5047 | 610390.095 | 503182.909 | 838.23  | -0.226000 | 0.051076 GRAV      |
| 5392 | 721371.048 | 497441.187 | 1233.17 | -0.226000 | 0.051076 TREE COVE |
| 5158 | 612610.941 | 414905.862 | 683.33  | 0.228000  | 0.051984 TALL GRAS |
| 5367 | 711498.356 | 497831.294 | 1202.18 | -0.229000 | 0.052441 BRUSH     |
| 5307 | 712872.391 | 504107.356 | 1271.98 | 0.232000  | 0.053824 TALL GRAS |
| 5640 | 714318.491 | 402138.911 | 718.72  | -0.232000 | 0.053824 TREE COVE |
| 5019 | 611795.307 | 498099.884 | 1035.72 | -0.233000 | 0.054289 LOW GRASS |
| 5014 | 611781.008 | 498088.854 | 1035.17 | -0.234000 | 0.054756 LOW GRASS |
| 5039 | 610377.949 | 503188.962 | 838.42  | -0.235000 | 0.055225 GRAV      |
| 5251 | 621453.092 | 423748.552 | 1131.18 | 0.235000  | 0.055225 BRUSH     |
| 5422 | 675027.861 | 448245.937 | 733.34  | -0.238000 | 0.056644 ASPH      |
| 5353 | 711508.371 | 497836.962 | 1202.94 | -0.239000 | 0.057121 BRUSH     |
| 5034 | 610373.331 | 503184.976 | 838.73  | -0.240000 | 0.057600 GRAV      |
| 5291 | 712619.428 | 506613.174 | 1171.82 | -0.240000 | 0.057600 LOW GRASS |
| 5302 | 712864.361 | 504111.733 | 1272.28 | 0.240000  | 0.057600 TALL GRAS |
| 5305 | 712876.073 | 504112.044 | 1271.97 | 0.242000  | 0.058564 TALL GRAS |
| 5099 | 600879.833 | 507825.919 | 767.48  | -0.243000 | 0.059049 ASPH      |
| 5119 | 604922.513 | 506466.198 | 765.12  | 0.243000  | 0.059049 BRUSH     |
| 5363 | 711514.917 | 497837.130 | 1203.12 | -0.243000 | 0.059049 BRUSH     |
| 5577 | 715009.050 | 402000.807 | 721.02  | -0.243000 | 0.059049 BRUSH     |
| 5122 | 604926.506 | 506476.836 | 765.18  | 0.246000  | 0.060516 BRUSH     |
| 5018 | 611792.005 | 498098.377 | 1035.60 | -0.247000 | 0.061009 LOW GRASS |
| 5106 | 604905.734 | 506458.314 | 764.63  | 0.247000  | 0.061009 BRUSH     |
| 5309 | 712864.601 | 504107.310 | 1272.09 | 0.250000  | 0.062500 TALL GRAS |
| 5365 | 711498.658 | 497840.882 | 1202.69 | -0.251000 | 0.063001 BRUSH     |
| 5027 | 610369.027 | 503184.091 | 838.85  | -0.252000 | 0.063504 GRAV      |
| 5011 | 611793.311 | 498092.997 | 1035.83 | -0.253000 | 0.064009 LOW GRASS |
| 5522 | 679323.674 | 444158.067 | 798.66  | 0.254000  | 0.064516 BRUSH     |
| 5022 | 611785.923 | 498100.355 | 1035.27 | -0.258000 | 0.066564 LOW GRASS |
| 5130 | 605139.388 | 506409.239 | 767.01  | -0.259000 | 0.067081 TREE COVE |
| 5543 | 674883.417 | 448776.635 | 734.55  | -0.259000 | 0.067081 TREE COVE |
| 5258 | 621448.912 | 423752.082 | 1131.67 | 0.260000  | 0.067600 BRUSH     |
| 5395 | 721370.371 | 497445.489 | 1233.16 | -0.261000 | 0.068121 TREE COVE |
| 5110 | 604911.289 | 506471.326 | 764.80  | 0.262000  | 0.068644 BRUSH     |
| 5328 | 712817.732 | 504030.512 | 1270.35 | 0.262000  | 0.068644 ASPH      |
| 5633 | 714310.162 | 402137.107 | 718.74  | -0.263000 | 0.069169 TREE COVE |
| 5466 | 674852.369 | 449121.543 | 727.60  | 0.264000  | 0.069696 TALL GRAS |
| 5636 | 714305.349 | 402141.581 | 718.49  | -0.265000 | 0.070225 TREE COVE |
| 5393 | 721366.974 | 497441.549 | 1233.31 | -0.266000 | 0.070756 TREE COVE |
| 5536 | 674882.750 | 448767.615 | 734.44  | -0.266000 | 0.070756 TREE COVE |
| 5091 | 600888.407 | 507815.162 | 767.61  | -0.267000 | 0.071289 ASPH      |
| 5273 | 621442.950 | 423751.631 | 1132.59 | 0.267000  | 0.071289 BRUSH     |
| 5460 | 674860.594 | 449136.587 | 727.56  | 0.268000  | 0.071824 TALL GRAS |
| 5509 | 679331.039 | 444159.049 | 798.69  | 0.269000  | 0.072361 BRUSH     |
| 5357 | 711511.797 | 497841.087 | 1203.23 | -0.274000 | 0.075076 BRUSH     |
| 5371 | 711493.942 | 497841.176 | 1202.38 | -0.274000 | 0.075076 BRUSH     |
| 5387 | 721379.605 | 497437.075 | 1232.98 | -0.274000 | 0.075076 TREE COVE |
| 5358 | 711511.709 | 497837.047 | 1202.94 | -0.275000 | 0.075625 BRUSH     |
| 5134 | 605134.735 | 506413.235 | 766.89  | -0.275000 | 0.075625 TREE COVE |
| 5461 | 674856.358 | 449136.788 | 727.50  | 0.280000  | 0.078400 TALL GRAS |
| 5270 | 621438.586 | 423760.222 | 1133.32 | 0.283000  | 0.080089 BRUSH     |
| 5252 | 621449.697 | 423748.392 | 1131.60 | 0.285000  | 0.081225 BRUSH     |
| 5164 | 612623.249 | 414901.182 | 683.20  | 0.286000  | 0.081796 TALL GRAS |
| 5672 | 700764.769 | 419606.913 | 728.09  | 0.286000  | 0.081796 GRAV      |
| 5133 | 605138.814 | 506413.172 | 766.94  | -0.290000 | 0.084100 TREE COVE |
| 5165 | 612627.425 | 414902.964 | 683.15  | 0.292000  | 0.085264 TALL GRAS |
| 5325 | 712876.838 | 504092.759 | 1271.54 | 0.293000  | 0.085849 TALL GRAS |

|      |            |            |         |           |          |            |
|------|------------|------------|---------|-----------|----------|------------|
| 5001 | 611796.010 | 498084.058 | 1036.20 | -0.295000 | 0.087025 | LOW GRASS  |
| 5264 | 621456.405 | 423760.285 | 1130.48 | 0.295000  | 0.087025 | BRUSH      |
| 5501 | 679334.981 | 444161.447 | 798.55  | 0.295000  | 0.087025 | BRUSH      |
| 5464 | 674856.537 | 449125.396 | 727.51  | 0.296000  | 0.087616 | TALL GRAS  |
| 5012 | 611789.299 | 498091.782 | 1035.81 | -0.297000 | 0.088209 | LOW GRASS  |
| 5169 | 612613.235 | 414914.431 | 682.95  | 0.300000  | 0.090000 | TALL GRASS |
| 5507 | 679331.243 | 444150.872 | 798.83  | 0.300000  | 0.090000 | BRUSH      |
| 5508 | 679331.410 | 444154.926 | 798.64  | 0.300000  | 0.090000 | BRUSH      |
| 5023 | 611781.893 | 498098.550 | 1035.02 | -0.301000 | 0.090601 | LOW GRASS  |
| 5098 | 600879.810 | 507830.337 | 767.52  | -0.301000 | 0.090601 | ASPH       |
| 5381 | 721375.840 | 497432.450 | 1233.13 | -0.302000 | 0.091204 | TREE COVE  |
| 5021 | 611789.878 | 498101.608 | 1035.46 | -0.304000 | 0.092416 | LOW GRASS  |
| 5167 | 612619.780 | 414908.456 | 683.24  | 0.305000  | 0.093025 | TALL GRAS  |
| 5366 | 711498.139 | 497835.679 | 1202.43 | -0.306000 | 0.093636 | BRUSH      |
| 5375 | 721372.145 | 497428.431 | 1233.19 | 0.306000  | 0.093636 | TREE COVE  |
| 5265 | 621455.814 | 423764.219 | 1130.49 | 0.307000  | 0.094249 | BRUSH      |
| 5149 | 605138.084 | 506421.571 | 766.83  | -0.307000 | 0.094249 | TREE COVE  |
| 5020 | 611794.206 | 498103.329 | 1035.61 | -0.309000 | 0.095481 | LOW GRASS  |
| 5154 | 612617.553 | 414894.976 | 683.01  | 0.309000  | 0.095481 | TALL GRAS  |
| 5380 | 721379.791 | 497432.759 | 1232.87 | -0.310000 | 0.096100 | TREE COVE  |
| 5168 | 612616.445 | 414911.333 | 683.10  | 0.311000  | 0.096721 | TALL GRAS  |
| 5257 | 621453.249 | 423751.570 | 1130.99 | 0.314000  | 0.098596 | BRUSH      |
| 5382 | 721371.136 | 497432.580 | 1233.30 | -0.316000 | 0.099856 | TREE COVE  |
| 5579 | 715015.416 | 401998.514 | 720.82  | -0.320000 | 0.102400 | BRUSH      |
| 5260 | 621452.265 | 423755.797 | 1131.08 | 0.321000  | 0.103041 | BRUSH      |
| 5269 | 621439.053 | 423764.024 | 1133.21 | 0.321000  | 0.103041 | BRUSH      |
| 5524 | 679319.885 | 444161.629 | 798.54  | 0.322000  | 0.103684 | BRUSH      |
| 5146 | 605140.749 | 506400.149 | 766.99  | -0.323000 | 0.104329 | TREE COVE  |
| 5125 | 604927.142 | 506461.172 | 765.02  | 0.325000  | 0.105625 | BRUSH      |
| 5547 | 674889.090 | 448774.755 | 734.48  | -0.325000 | 0.105625 | TREE COVE  |
| 5129 | 605136.114 | 506409.311 | 767.06  | -0.328000 | 0.107584 | TREE COVE  |
| 5147 | 605140.875 | 506397.886 | 767.01  | -0.330000 | 0.108900 | TREE COVE  |
| 5003 | 611788.386 | 498081.052 | 1035.94 | -0.331000 | 0.109561 | LOW GRASS  |
| 5362 | 711515.050 | 497832.684 | 1203.12 | -0.336000 | 0.112896 | BRUSH      |
| 5015 | 611779.239 | 498093.747 | 1034.95 | -0.338000 | 0.114244 | LOW GRASS  |
| 5172 | 612623.554 | 414911.399 | 683.10  | 0.338000  | 0.114244 | TALL GRAS  |
| 5160 | 612610.749 | 414912.263 | 683.05  | 0.340000  | 0.115600 | TALL GRAS  |
| 5163 | 612619.828 | 414903.321 | 683.17  | 0.340000  | 0.115600 | TALL GRAS  |
| 5104 | 604906.256 | 506467.382 | 764.78  | 0.341000  | 0.116281 | BRUSH      |
| 5026 | 610370.726 | 503180.103 | 838.93  | -0.344000 | 0.118336 | GRAV       |
| 5505 | 679334.975 | 444147.136 | 799.17  | 0.346000  | 0.119716 | BRUSH      |
| 5268 | 621443.800 | 423764.881 | 1132.35 | 0.348000  | 0.121104 | BRUSH      |
| 5171 | 612619.699 | 414914.704 | 683.09  | 0.349000  | 0.121801 | TALL GRAS  |
| 5451 | 674864.411 | 449136.620 | 727.54  | 0.349000  | 0.121801 | TALL GRAS  |
| 5628 | 714310.284 | 402133.058 | 718.77  | 0.352000  | 0.123904 | TREE COVE  |
| 5457 | 674860.400 | 449125.527 | 727.51  | 0.357000  | 0.127449 | TALL GRAS  |
| 5096 | 600883.534 | 507834.937 | 767.70  | -0.359000 | 0.128881 | ASPH       |
| 5637 | 714308.908 | 402140.681 | 718.54  | -0.365000 | 0.133225 | TREE COVE  |
| 5274 | 621443.664 | 423755.681 | 1132.47 | 0.366000  | 0.133956 | BRUSH      |
| 5463 | 674856.428 | 449129.204 | 727.54  | 0.366000  | 0.133956 | TALL GRAS  |
| 5647 | 714310.539 | 402146.611 | 718.67  | -0.367000 | 0.134689 | TREE COVE  |
| 5267 | 621447.851 | 423764.492 | 1131.76 | 0.368000  | 0.135424 | BRUSH      |
| 5635 | 714304.393 | 402137.975 | 718.55  | -0.369000 | 0.136161 | TREE COVE  |
| 5475 | 674848.319 | 449121.507 | 727.49  | 0.371000  | 0.137641 | TALL GRAS  |
| 5469 | 674852.500 | 449132.653 | 727.58  | 0.373000  | 0.139129 | TALL GRAS  |
| 5578 | 715012.256 | 401999.851 | 721.01  | -0.373000 | 0.139129 | BRUSH      |
| 5100 | 600879.607 | 507820.273 | 767.40  | -0.374000 | 0.139876 | ASPH       |
| 5013 | 611784.639 | 498090.118 | 1035.52 | -0.381000 | 0.145161 | LOW GRASS  |
| 5467 | 674852.407 | 449125.296 | 727.55  | 0.381000  | 0.145161 | TALL GRAS  |

|      |            |            |         |           |          |           |
|------|------------|------------|---------|-----------|----------|-----------|
| 5456 | 674860.572 | 449121.904 | 727.52  | 0.383000  | 0.146689 | TALL GRAS |
| 5152 | 612610.247 | 414900.199 | 683.18  | 0.385000  | 0.148225 | TALL GRAS |
| 5455 | 674864.523 | 449122.185 | 727.58  | 0.385000  | 0.148225 | TALL GRAS |
| 5383 | 721367.244 | 497432.485 | 1233.65 | -0.388000 | 0.150544 | TREE COVE |
| 5458 | 674860.382 | 449129.359 | 727.52  | 0.389000  | 0.151321 | TALL GRAS |
| 5638 | 714311.817 | 402140.045 | 718.65  | -0.393000 | 0.154449 | TREE COVE |
| 5454 | 674864.484 | 449126.005 | 727.52  | 0.396000  | 0.156816 | TALL GRAS |
| 5259 | 621448.846 | 423756.095 | 1131.53 | 0.400000  | 0.160000 | BRUSH     |
| 5016 | 611783.927 | 498095.312 | 1035.32 | -0.404000 | 0.163216 | LOW GRASS |
| 5262 | 621448.140 | 423760.525 | 1131.63 | 0.405000  | 0.164025 | BRUSH     |
| 5112 | 604916.376 | 506476.012 | 764.94  | 0.409000  | 0.167281 | BRUSH     |
| 5173 | 612627.176 | 414908.733 | 683.04  | 0.414000  | 0.171396 | TALL GRAS |
| 5502 | 679335.113 | 444158.054 | 798.56  | 0.415000  | 0.172225 | BRUSH     |
| 5465 | 674856.457 | 449121.764 | 727.50  | 0.416000  | 0.173056 | TALL GRAS |
| 5462 | 674856.367 | 449132.821 | 727.51  | 0.417000  | 0.173889 | TALL GRAS |
| 5468 | 674852.291 | 449129.077 | 727.45  | 0.423000  | 0.178929 | TALL GRAS |
| 5017 | 611788.048 | 498096.834 | 1035.66 | -0.427000 | 0.182329 | LOW GRASS |
| 5275 | 621443.302 | 423759.414 | 1132.45 | 0.430000  | 0.184900 | BRUSH     |
| 5111 | 604911.826 | 506476.714 | 764.84  | 0.431000  | 0.185761 | BRUSH     |
| 5504 | 679335.244 | 444150.622 | 798.85  | 0.431000  | 0.185761 | BRUSH     |
| 5253 | 621446.556 | 423748.323 | 1131.99 | 0.432000  | 0.186624 | BRUSH     |
| 5506 | 679330.948 | 444147.237 | 799.01  | 0.433000  | 0.187489 | BRUSH     |
| 5157 | 612613.070 | 414902.899 | 683.20  | 0.434000  | 0.188356 | TALL GRAS |
| 5174 | 612630.735 | 414905.928 | 682.97  | 0.434000  | 0.188356 | TALL GRAS |
| 5166 | 612622.815 | 414907.277 | 683.08  | 0.436000  | 0.190096 | TALL GRAS |
| 5473 | 674848.179 | 449128.915 | 727.53  | 0.439000  | 0.192721 | TALL GRAS |
| 5156 | 612616.693 | 414901.101 | 683.14  | 0.440000  | 0.193600 | TALL GRAS |
| 5644 | 714310.037 | 402143.714 | 718.53  | -0.447000 | 0.199809 | TREE COVE |
| 5474 | 674848.118 | 449125.351 | 727.44  | 0.453000  | 0.205209 | TALL GRAS |
| 5271 | 621438.356 | 423755.838 | 1133.28 | 0.463000  | 0.214369 | BRUSH     |
| 5175 | 612604.555 | 414905.847 | 682.98  | 0.467000  | 0.218089 | TALL GRAS |
| 5472 | 674848.213 | 449132.537 | 727.54  | 0.467000  | 0.218089 | TALL GRAS |
| 5470 | 674852.380 | 449136.674 | 727.56  | 0.473000  | 0.223729 | TALL GRAS |
| 5151 | 612607.421 | 414903.215 | 683.06  | 0.474000  | 0.224676 | TALL GRAS |
| 5453 | 674864.271 | 449129.479 | 727.60  | 0.479000  | 0.229441 | TALL GRAS |
| 5471 | 674848.201 | 449136.551 | 727.52  | 0.484000  | 0.234256 | TALL GRAS |
| 5153 | 612613.699 | 414897.762 | 683.00  | 0.490000  | 0.240100 | TALL GRAS |
| 5162 | 612616.811 | 414905.413 | 683.20  | 0.490000  | 0.240100 | TALL GRAS |
| 5646 | 714307.348 | 402147.093 | 718.67  | -0.497000 | 0.247009 | TREE COVE |
| 5170 | 612616.769 | 414917.632 | 682.89  | 0.500000  | 0.250000 | TALL GRAS |
| 5272 | 621438.553 | 423752.671 | 1133.16 | 0.516000  | 0.266256 | BRUSH     |
| 5266 | 621452.042 | 423763.312 | 1131.07 | 0.519000  | 0.269361 | BRUSH     |
| 5159 | 612607.391 | 414909.059 | 682.88  | 0.520000  | 0.270400 | TALL GRAS |
| 5459 | 674860.410 | 449132.750 | 727.48  | 0.521000  | 0.271441 | TALL GRAS |
| 5254 | 621443.671 | 423748.602 | 1132.39 | 0.523000  | 0.273529 | BRUSH     |
| 5648 | 714313.455 | 402145.867 | 718.60  | -0.525000 | 0.275625 | TREE COVE |
| 5452 | 674864.358 | 449132.861 | 727.57  | 0.536000  | 0.287296 | TALL GRAS |
| 5155 | 612620.672 | 414898.328 | 682.92  | 0.570000  | 0.324900 | TALL GRAS |
| 5361 | 711515.306 | 497828.452 | 1203.12 | -0.591000 | 0.349281 | BRUSH     |
| 5351 | 711507.247 | 497828.825 | 1202.63 | -0.598000 | 0.357604 | BRUSH     |
| 5364 | 711499.710 | 497844.898 | 1203.11 | -0.625000 | 0.390625 | BRUSH     |
| 5643 | 714313.170 | 402143.157 | 718.58  | -0.630000 | 0.396900 | TREE COVE |

|           |           |
|-----------|-----------|
| SUM       | 28.552379 |
| AVERAGE   | 0.040789  |
| RMSE      | 0.201963  |
| Accuracyz | 0.395848  |



**FIELD NOTES**

Project FEMA ground survey notes

Contains point number and descriptions

Includes Control and Check Points left out of statistical analysis

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5-31-2011 Richland County  
Ground Truthing

MCE

LOCATION 1

Base @ PID DH5159 (Forest c GPS)  
Ant. Ht: 0.879m  
GDOP: 3.3

Checked into PID DH8415 (3502)  
+0.14'

Low grass: Points 5000-5024  
Gravel: Points 5025-5051  
Tall grass: Points 5052-5076  
Asphalt: Points 5077-5101  
Brush/low Trees: Points 5102-5126  
Tree Cover: Points 5127-5150

6-01-2011

MCE

LOCATION 2

Base @ PID DH5364 (Excel's or GPS)  
Ant. Ht: 0.921m  
GDOP: 2.2

Attempted to check in to:

EGLE as GPS

Richwood S GPS

Alexis S GPS

- could not receive radio  
from base at any location

Tall Grass: 5151-5175  
Asphalt: 5176-5200  
Low Grass: 5201-5225  
Gravel: 5226-5250  
Brush/low Trees: 5251-5275

Unable to find full tree cover  
within GPS range that was  
not on a steep slope

6-1-2011 Cont.

LOCATION 3

Base @ PID 0N1309 (Cazenovia GPS)

Ant. Ht: 1.179m

GDOP: 3.2

Checked PID DH8437 (3T01)

Elev: 1258.73

Published: 1258.78

Low Grass: 5276 - 5300

Tall Grass: 5301 - 5325

Asphalt: 5326 - 5350

Brush/Jun Trees: 5351 - 5375

Tree Cover: 5379 - 5399 \* Change numbers

from 5354-5379

No gravel surface found.

6-2-2011

55°F, Partly Sunny

MCF

LOCATION 4

Base @ Rickland W GPS

Ant Ht: 1.006m

GDOP: 1.8

Checked Rickland W GPS

Elev: 1111.44

Published: 1111.40

Asphalt: 5401 - 5425

Low Grass: 5426 - 5450

Tall Grass: 5451 - 5475

Gravel: 5476 - 5500

Brush/Low Trees: 5501 - 5525

Tree Cover: 5526 - 5550

LOCATION 5

BRSE @ Buena Vista GPS

Ant. Ht: 1,153 m

GDOP: 2.6

Checked POOLE AZ MARK:

Elevation: 720.08

Published: 720.08

Tall Grass: 5551 - 5575

Brush/low Trees: 5576 - 5600

Mowed Grass: 5601 - 5625

Tree Cover: 5626 - 5650

Gravel: 5651 - 5675