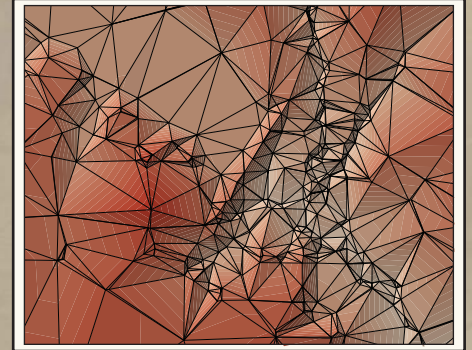


# LiDAR Digital Terrain Model Geospatial Data and Quality Control Checking Results Oklahoma LiDAR Mapping Project - 2 Meter Resolution Natural Resources Conservation Service Oklahoma

Contract No. AG-3A75-C-09-0021

Task Order No. AG-3A75-D-09-0029

AMEC Job No. 09-117-70105



**DRAFT**



July 2010



July 29, 2010  
AMEC Job No. 09-117-70105

United States Department of Agriculture  
Natural Resources Conservation Service  
100 USDA, Suite 206  
Stillwater, Oklahoma 747074

Attn: Gary Utley

**Re: Geospatial Data and Quality Control Checking Results  
LiDAR Digital Terrain Model  
Oklahoma LiDAR Mapping Project – 2 Meter Resolution  
Natural Resources Conservation Service Oklahoma  
Contract No. AG-3A75-C-09-0021  
Task Order No. AG-3A75-D-09-0029**

AMEC Earth & Environmental, Inc. hereby submits a draft copy of the *Geospatial Data and Quality Control Checking Results* report for the Oklahoma 2-meter Resolution LiDAR Mapping Project. We have enclosed one copy of the report and geospatial data on one external USB hard drive for your review and comment. Once your review is complete, please return the external USB hard drive and any comments to my attention so that we may address your comments and prepare the final submittal for delivery.

Please feel free to contact me if you have any questions regarding this submittal. I may be reached at (480) 940-2320 ext. 116 or at [brett.howey@amec.com](mailto:brett.howey@amec.com).

Respectfully submitted,

**AMEC Earth & Environmental, Inc.**



Brett A. Howey, P.E.  
Unit Manager Geotechnical Services  
Program Administrator

Z:\Geotechnical\2009 Projects\09-117-70105 NRCS Oklahoma LiDAR\Quality Assurance Checks\Final Report\NRCS Draft Final Report Text.doc

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	- Base Control Set by AMEC
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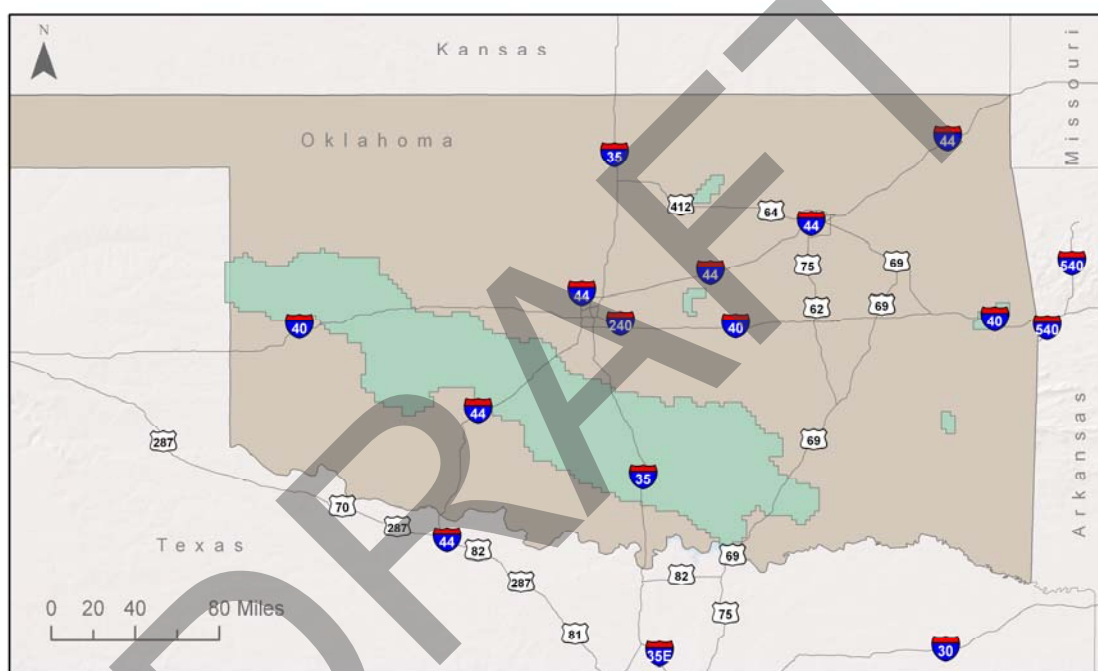
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## LIST OF ACRONYMS AND ABBREVIATIONS

AMEC	AMEC Earth & Environmental, Inc.
ASPRS	American Society for Photogrammetry and Remote Sensing
DSM	Digital Surface Model. Used throughout the report to refer to the surface grid model produced by Merrick.
ESRI™	Environmental Systems Research Institute
FGDC	Federal Geographic Data Committee
GPS	Global Positioning System
GSD	Ground Sample Distance
LAS	ASPRS LASer File Format Exchange
LiDAR	<u>L</u> ight <u>D</u> etection <u>A</u> nd <u>R</u> anging
Merrick	Merrick & Company
NAD83	North American Datum of 1983 (1986 Realization). This is the datum used for all survey data and DSM deliverables.
NAVD88	North American Vertical Datum of 1988
NDEP	National Digital Elevation Program
NGS	National Geodetic Survey
NRCS	Natural Resources Conservation Service
NSSDA	National Standard for Spatial Data Accuracy
PDOP	Position Dilution of Precision
RMSE	Root Mean Square Error
TB	Terabyte
UTM	Universal Transverse Mercator

## 1.0 INTRODUCTION

AMEC Earth & Environmental, Inc. (AMEC) subcontracted Merrick & Company (Merrick) to perform a LiDAR (Light Detection and Ranging) survey of the State of Oklahoma covering five areas totaling 9,370 square miles. The mapping areas are shown below on **Figure 1.1**. The purpose of the survey was to collect and produce accurate high-resolution LiDAR data for use in planning, design and research. The data meet or exceed accuracy standards for both horizontal and vertical measurements as stated in the National Digital Elevation Program's *Guidelines for Digital Elevation Data, Version 1* for the National Standard for Spatial Data Accuracy (NSSDA) of 95% confidence for 2-foot contours and American Society for Photogrammetry and Remote Sensing (ASPRS) Class I Standards<sup>1</sup>.



**Figure 1.1 - Mapping Areas**

The following sections explain and/or reference the survey control; LiDAR acquisition and processing; data quality checking process; and deliverables packaging.

<sup>1</sup> The National Standard for Spatial Data Accuracy (NSSDA, defined at [www.fgdc.com](http://www.fgdc.com)) uses the root mean square error (RMSE) to estimate both horizontal and vertical accuracy. RMSE is the square root of the average of the set of squared differences between dataset coordinate values and coordinate values from an independent source of higher accuracy for identical points. If those differences are normally distributed and average zero, 95 percent of any sufficiently large sample should be less than 1.96 times the RMSE. Therefore 18.5-centimeter RMSE is referred to as "36.3-centimeter accuracy at the 95-percent confidence level." Following that convention, the vertical accuracy of any DEM is defined as 1.96 times the RMSE of linearly interpolated elevations in the DEM, as compared with known elevations from high-accuracy test points.

## **2.0 GROUND SURVEY CONTROL**

AMEC surveying crews set out 838 ground surveying points to control and check Merrick's LiDAR mapping process. Details of these control points, and notes about the conduct of the ground survey process itself, are contained in **Appendix A**.

## **3.0 LIDAR SYSTEM AND FLIGHT REPORT**

The description of the LiDAR data collection process and data processing quality control is provided in **Appendix B**.

## **4.0 AMEC LIDAR DATA QUALITY CHECKING PROCESS**

AMEC surveyed a total of 838 points and provided Merrick with 666 (80%) of the points for purposes of digital surface model (DSM) creation. The remaining 172 (20%) surveyed points were withheld from Merrick and used by AMEC personnel to independently check the accuracy of the derived DSM. The blind survey points are provided in **Table 1**.

Eleven of the blind survey points were rejected for data quality purposes, as they either fell in close proximity to abrupt changes in slope, or were inundated by the spring flooding.

The area mapped is located within two zones of the universal transverse Mercator (UTM) coordinate system. Of the blind survey points, 159 occurred within Zone 14; the remaining two points were located in Zone 15.

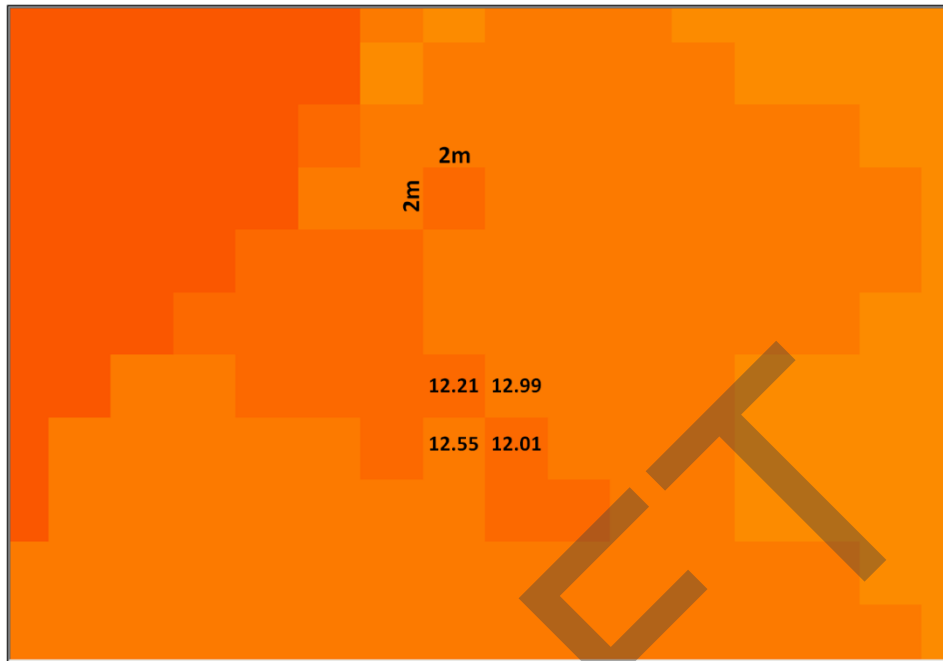
The following section describes the automated quality assurance process that was utilized.

### **4.1 Bare-Earth Grid Elevation Checking Process**

Merrick's model of the project's bare-earth surface was delivered as an ESRI™ GRID-format file, aggregated from 2,743 individual quarter-quad grid tiles. Each cell in the grid mosaic was 2 meters square, with an associated floating-point elevation value ranging from a low elevation of 137.476 meters to the highest elevation of 785.359 meters over the entire project area.

The ESRI™ `gp.GetCellValue_management` grid processing function was invoked in a script file, comparing each of the 160 blind survey points' Z-values to the corresponding DSM Z-value at the blind survey X,Y coordinate locations.

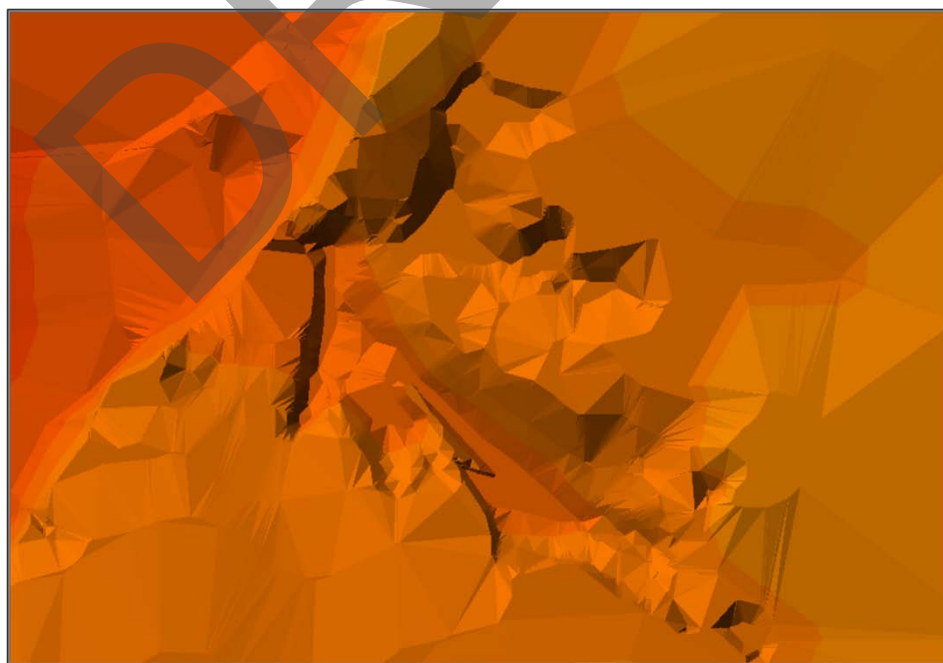
Normally, such elevation checks are made against a continuous DSM such as that modeled by a Triangulated Irregular Network (TIN), rather than a discrete, "jumpy" grid surface.



**Figure 4.1 - Typical Grid Model**

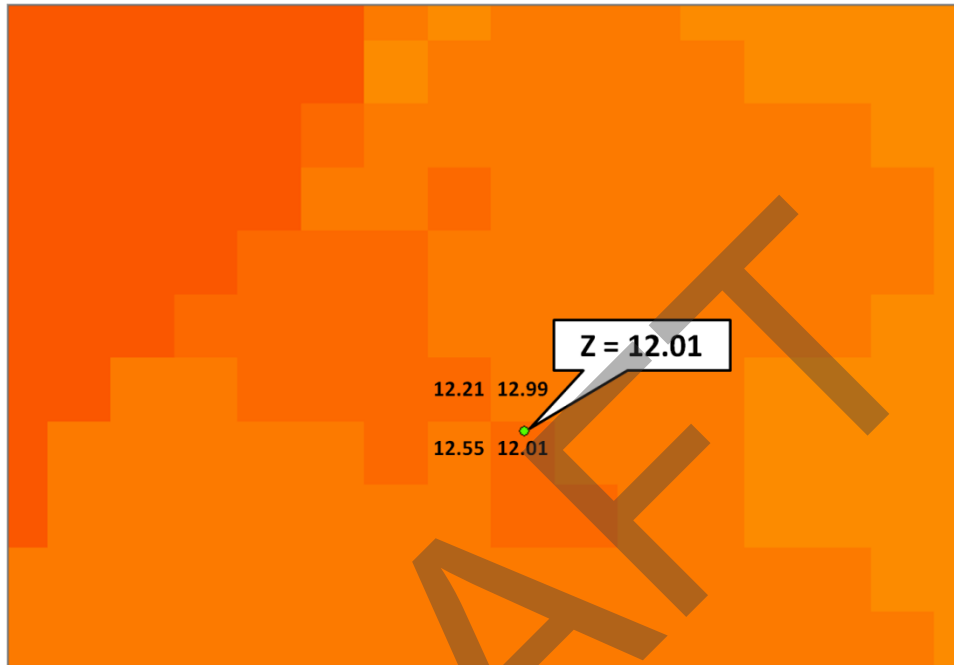
**Figure 4.1** shows a typical grid area of 2m x 2m grid cells. Four grid cells are labeled with their respective elevation values for this example.

In the same model area, shown in **Figure 4.2**, a TIN model would better show the interpolated surface between the individual grid cells:



**Figure 4.2 - Typical TIN Model**

In the following figures, a blind survey point falls close to a grid cell boundary. Its elevation from the DSM as modeled by a TIN has a 0.28m difference compared to the elevation derived from the bounding cell:



**Figure 4.3 - Elevation Shown on Grid Model**



**Figure 4.4 - Elevation Shown on TIN Model**



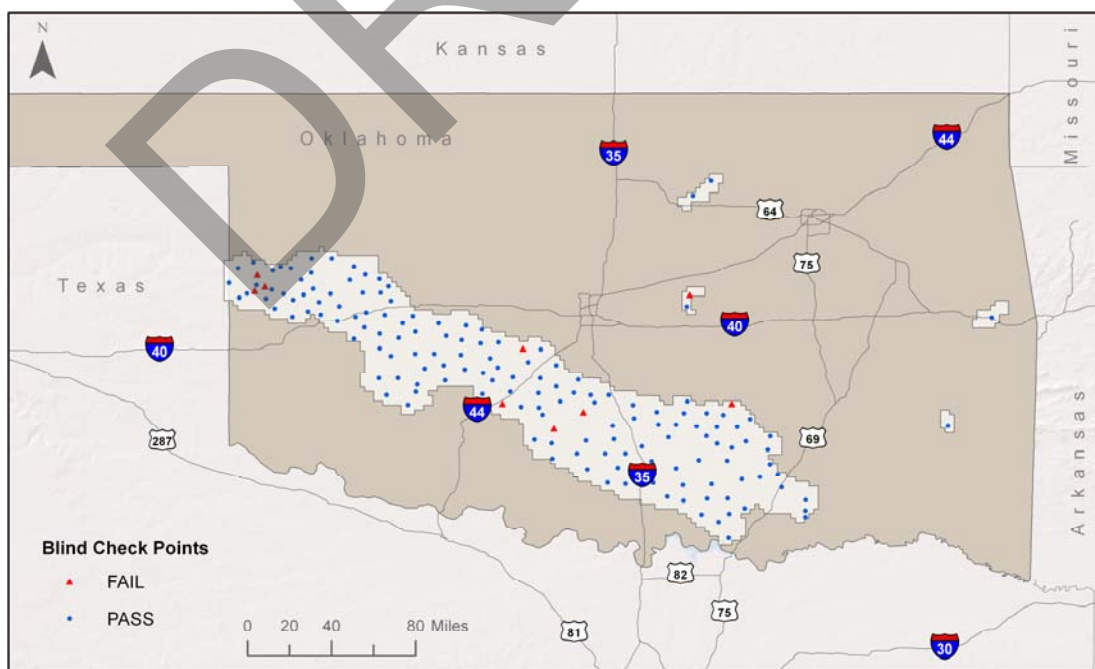
The continuous TIN model shown in **Figure 4.4** represents the surface better than the cell-based model. However, this hypothetical point lies on a sloping area of the surface, and is not a reliable position to check the DSM.

Despite a TIN's more accurate continuous surface representations, AMEC utilized cell-based checking (*pessimistic comparison*) for the elevation verification process. It was not desirable to create a secondary surface model (i.e., a grid-derived TIN) that had not been provided by Merrick. As well, the pessimistic comparison for the grid surface tended to reveal the placement of blind survey control points that were obtained in sloping areas, and therefore, unreliable.

## 4.2 DSM Checking Results

Per the Scope of Work, Exhibit A, accuracy requirements for the LiDAR data must meet vertical accuracy ( $Accuracy_z$ ) as stated in the National Digital Elevation Program (NDEP) Guidelines for digital elevation data for NSSDA of 95% confidence interval, for two-foot contours. The root mean square error ( $RMSE_z$ ) may not exceed  $\pm 0.185$  meters.

The calculated  $RMSE_z$  for the DSM was 10.1 cm with an  $Accuracy_z$  of 19.8 cm. **Table 2** lists the results of the comparison of the bare-earth grids mosaic to the blind survey points (column Z contains the blind survey point elevations, column DTM\_Z is the elevation derived from the Merrick bare-earth grid at the X,Y survey control point position). Column Z\_Diff lists the difference between the blind survey point elevation and the calculated DSM elevation. The Pass/Fail column indicates whether the points fell within or outside of the acceptable  $RMSE_z$  parameters; points outside the parameters are highlighted. **Figure 4.5** shows the distribution of points and identifies those that fell within tolerance (green points) and those points that exceeded the 18.5 cm tolerance (red points).



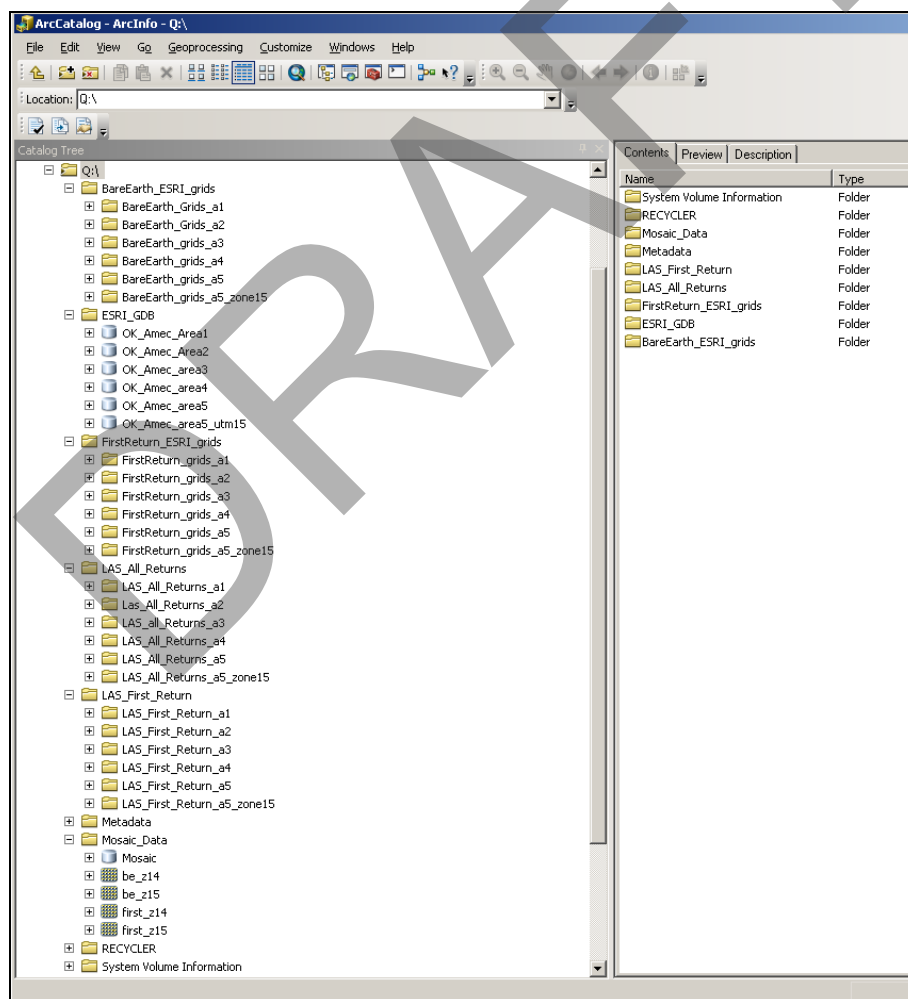
**Figure 4.5 - LiDAR Point Distribution**

### 4.3 NODATA Grid Cells Checking

In certain areas of the LiDAR mapping, unreliable elevations were returned, primarily due to signal scattering on unstable water surfaces. The maximum allowable percentage of NODATA cells was contractually specified at 5%. Individual mapping areas during the course of data processing were checked for this tolerance, and all fell within the contractual limits. However, at the request of NRCS, all such NODATA cells were populated with nearest-neighbor elevation values and attributed as such in the delivered individual mapping areas and mosaic grids (bare-earth processed data only). Copies of the NODATA check can be found in **Appendix C**.

### 5.0 DELIVERABLES PACKAGING

Data for this submittal is stored on the accompanying Western Digital® My Book® Elite™ 2 terabyte (TB) external hard drive (Serial Number WCAVY1911760). Figure 5.1 illustrates the folder layout and contents.



**Figure 5.1 - Data Organization**

## 6.0 “VIRUS FREE” CERTIFICATION

AMEC GIS Specialist, Ellen Carroll, scanned the 2 TB drive for viruses and other potentially-corrupting data on July 29, 2010 using Trend Micro™ OfficeScan™ Client for Windows, Version 10.0 Service Pack 1. No viruses or security risks were found. Confirmation of the virus scan can be found in **Appendix D**.

## 7.0 REFERENCES

National Digital Elevation Program (NDEP). 2004. Guidelines for Digital Elevation Data. May 10. [www.ndep.gov/NDEP\\_Elevation\\_Guidelines\\_Ver1\\_10May2004.pdf](http://www.ndep.gov/NDEP_Elevation_Guidelines_Ver1_10May2004.pdf)

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**TABLES**

**Table 1**  
**Blind Survey Points**

ID	X	Y	Z	NOTES
3007	409808.688	3949221.108	752.95	BLIND PROOF 3
3008	425784.625	3943396.615	686.55	BLIND PROOF(2) 25
3009	426835.707	3947416.75	651.85	BLIND PROOF(2) 26
3016	415533.283	3960405.272	702.25	BLIND PROOF 7
3018	432247.838	3946568.908	617.9	BLIND PROOF 35
3019	425292.835	3965056.575	725.95	BLIND PROOF 30
3021	427568.328	3955414.563	657.2	BLIND PROOF 28
3026	437239.029	3958543.596	698	BLIND PROOF(2) 47
3027	416075.516	3937933.318	760.8	BLIND PROOF 11
3033	420922.409	3941079.126	722.15	BLIND PROOF 19
3035	438159.492	3929678.088	707	BLIND PROOF 41
3040	443823.915	3940872.401	590.65	BLIND PROOF 52
3046	436531.238	3944105.592	634.5	BLIND PROOF(2) 44
3052	432747.901	3937213.861	646.4	BLIND PROOF 37
3053	438268.637	3951932.978	610	BLIND PROOF 46
3056	442042.699	3961366.172	688.15	BLIND PROOF 48
3057	448461.662	3960112.178	691.3	BLIND PROOF 64
3065	454770.648	3951365.319	585	BLIND PROOF 70
3067	456243.355	3940010.98	547.6	BLIND PROOF 72
3071	449263.099	3923172.693	633.65	BLIND PROOF 57
3072	449782.682	3936006.335	580.25	BLIND PROOF 59
3074	462287.939	3944467.594	549.45	BLIND PROOF 79
3077	472345.904	3951959.912	526.7	BLIND PROOF 104
3080	473909.016	3967976.523	601.2	BLIND PROOF 107
3083	461503.333	3967994.822	641.8	BLIND PROOF 83
3088	461148.536	3956818.24	548.8	BLIND PROOF 81
3090	473043.53	3940713.046	531.95	BLIND PROOF 102
3097	478627.724	3931106.95	527.8	BLIND PROOF 115
3100	465903.809	3934293.451	583.65	BLIND PROOF 91
3102	458936.163	3927180.49	649.2	BLIND PROOF 76
3105	466956.316	3924705.378	598.35	BLIND PROOF 94
3110	477246.79	3919864.968	542.15	BLIND PROOF 118
3120	487780.631	3961540.899	571.75	BLIND PROOF 137
3124	494759.638	3955106.086	531.05	BLIND PROOF 177
3129	485161.541	3951111.797	508.3	BLIND PROOF 132
3138	493172.878	3941340.515	500	BLIND PROOF 142
3140	504417.133	3941350.638	507.2	BLIND PROOF 184
3143	509212.216	3946261.17	534.35	BLIND PROOF 213
3145	503605.157	3951896.532	541.8	BLIND PROOF 181
3153	488645.497	3923035.922	532.8	BLIND PROOF 123
3158	518163.447	3918202.125	477.6	BLIND PROOF 218
3162	524593.246	3923916.369	523.25	BLIND PROOF 255
3165	506955.534	3924631.311	482.95	BLIND PROOF 187
3169	510841.407	3935150.161	514.65	BLIND PROOF 211

**Table 1**  
**Blind Survey Points**

ID	X	Y	Z	NOTES
3173	495354.252	3926358.923	474.45	BLIND PROOF 145
3176	515794.635	3906972.571	452.5	BLIND PROOF 206
3182	510841.245	3893075.92	486.1	BLIND PROOF 193
3186	503766.47	3898908.533	472.65	BLIND PROOF 165
3188	503766.781	3910169.989	463.65	BLIND PROOF 169
3190	494180.148	3915016.875	488.8	BLIND PROOF 147
3193	487732.059	3906149.251	573.8	BLIND PROOF 126
3206	537951.096	3894950.153	447.75	BLIND PROOF 263
3208	525965.444	3894923.35	448.6	BLIND PROOF 244
3216	540586.564	3918199.809	500.9	BLIND PROOF 259
3221	526171.235	3911748.961	497.6	BLIND PROOF 250
3236	503282.026	3876297.732	454.75	BLIND PROOF 161
3239	508160.395	3863483.837	459.5	BLIND PROOF 160
3245	521613.507	3855964.799	508.75	BLIND PROOF 230
3251	527424.846	3871549.511	434.45	BLIND PROOF 236
3255	526648.969	3865910.934	464.5	BLIND PROOF 233
3260	544094.927	3886168.752	405.95	BLIND PROOF 270
3266	544948.026	3874766.555	425.55	BLIND PROOF 268
3270	532077.49	3883596.153	398.9	BLIND PROOF 241
3274	515332.359	3876298.251	424.95	BLIND PROOF 201
3279	578227.59	3904015.065	399.6	BLIND PROOF 325
3281	567068.169	3903113.917	445.1	BLIND PROOF 320
3285	545439.979	3908599.494	464.6	BLIND PROOF 623
3292	555061.031	3905467.023	468.15	BLIND PROOF 285
3295	557799.335	3916697.572	436.4	BLIND PROOF 287
3301	567769.453	3913520.846	494.8	BLIND PROOF 323
3303	554740.678	3894243.853	445.4	BLIND PROOF 283
3307	573170.183	3891754.489	424.05	BLIND PROOF 315
3310	574725.375	3874936.307	377.9	BLIND PROOF 309
3314	568815.915	3880575.176	359.15	BLIND PROOF 311
3324	557207.657	3883016.721	378.35	BLIND PROOF 281
3328	593602.688	3899331.842	365.6	BLIND PROOF 351
3334	578005.641	3884730.488	350	BLIND PROOF 334
3337	587544.725	3877480.687	350.4	BLIND PROOF 346
3344	597036.153	3888914.999	344.75	BLIND PROOF 355
3347	604848.534	3898705.536	381.05	BLIND PROOF 378
3355	614695.526	3886713.651	381.95	BLIND PROOF 408
3358	604801.411	3876920.163	325.25	BLIND PROOF(2) 383
3369	581202.552	3857327.251	400.8	BLIND PROOF 339
3372	592857.726	3854946.917	409.05	BLIND PROOF 360
3374	604107.554	3854407.232	365.95	BLIND PROOF 387
3379	603719.793	3865528.349	344.35	BLIND PROOF 385
3383	586034.553	3866167.74	382.75	BLIND PROOF 344
3388	568396.081	3864478.827	420.75	BLIND PROOF 301

**Table 1**  
**Blind Survey Points**

ID	X	Y	Z	NOTES
3401	606571.363	3849053.818	401.05	BLIND PROOF 388
3409	613922.755	3838653.7	389.95	BLIND PROOF 399
3417	612458.361	3827130.328	349.8	BLIND PROOF 397
3420	601623.996	3829703.178	374.15	BLIND PROOF 365
3424	636668.714	3864453.721	334.7	BLIND PROOF 464
3427	639221.419	3858899.529	305.3	BLIND PROOF(2) 463
3433	617551.175	3859358.574	333.95	BLIND PROOF 416
3437	614855.065	3870600.589	348.1	BLIND PROOF 414
3439	626024.208	3865911.594	358.8	BLIND PROOF 439
3442	628653.118	3876133.397	372.1	BLIND PROOF 413
3445	648008.217	3864633.309	323.8	BLIND PROOF 468
3449	663372.137	3857174.715	315.85	BLIND PROOF 517
3459	632247.324	3851512.198	312.9	BLIND PROOF 441
3467	613143.078	3815103.158	343.2	BLIND PROOF 395
3472	628653.241	3819263.735	320.1	BLIND PROOF 450
3486	678536.732	3852218.621	332.25	BLIND PROOF 646
3489	679711.947	3842576.326	318.95	BLIND PROOF 643
3492	667011.015	3835932.333	255.75	BLIND PROOF 539
3497	664204.591	3847155.214	266.4	BLIND PROOF 519
3506	634185.108	3829409.771	326.8	BLIND PROOF 458
3509	651858.156	3830877.004	284.5	BLIND PROOF 481
3512	650871.372	3841342.613	305.6	BLIND PROOF 476
3520	646412.49	3819513.668	268.6	BLIND PROOF 486
3524	648415.509	3797094.798	283.7	BLIND PROOF 495
3529	635367.77	3807281.505	317.8	BLIND PROOF 453
3535	659303.728	3819728.277	308.85	BLIND PROOF 506
3541	686311.59	3833033.318	347.45	BLIND PROOF 641
3550	669609.416	3825515.391	246.85	BLIND PROOF 537
3562	691562.334	3809025.64	315.9	BLIND PROOF 562
3565	705863.018	3815713.615	347.75	BLIND PROOF 588
3580	666266.506	3786031.42	280.5	BLIND PROOF 529
3583	659682.3	3796382.889	271.5	BLIND PROOF 502
3584	677315.474	3797434.874	256.55	BLIND PROOF 555
3590	675982.714	3814351.641	286.6	BLIND PROOF 552
3592	654724.71	3808584.499	392.25	BLIND PROOF 499
3595	696193.861	3796171.925	282.8	BLIND PROOF 573
3598	696676.119	3784260.133	217.35	BLIND PROOF 571
3602	686371.145	3787148.383	226.65	BLIND PROOF 647
3611	714342.641	3797352.56	247.75	BLIND PROOF 595
3617	711833.209	3786285.065	199.65	BLIND PROOF 598
3625	724797.855	3786764.467	225.15	BLIND PROOF 600
3627	708428.114	3773927.163	231.65	BLIND PROOF 585
3637	726203.273	3756462.241	196.6	BLIND PROOF 615
3644	726040.765	3774879.928	209.5	BLIND PROOF 611

**Table 1**  
**Blind Survey Points**

ID	X	Y	Z	NOTES
3646	719543.415	3768532.769	212.7	BLIND PROOF 606
3647	697553.811	4018343.5	270.25	BLIND PROOF 2649
3651	708584.81	4029851.381	262.3	BLIND PROOF 2652
3654	695721.56	3932996.206	260.4	BLIND PROOF 2654
3657	697281.255	3941974.604	249.7	BLIND PROOF 2670
3662	342007.657	3923825.417	178	BLIND PROOF 669 UTM ZONE 15
3667	312933.353	3841962.214	204.7	BLIND PROOF 662 UTM ZONE 15
3671	751847.024	3779813.489	221.65	BLIND PROOF(2) 887
3678	758956.054	3796033.665	158.75	BLIND PROOF(2) 870
3680	744520.854	3789221.743	196.3	BLIND PROOF(2) 874
3690	735830.547	3779364.787	212.7	BLIND PROOF(2) 785
3695	762125.408	3783603.88	188.3	BLIND PROOF(2) 889
3698	764226.579	3775226.419	194.6	BLIND PROOF(2) 894
3701	774554.56	3773879.999	213.4	BLIND PROOF(2) 793
3702	774401.637	3778719.26	191	BLIND PROOF(2) 790
3709	765962.882	3791386.742	179.15	BLIND PROOF(2) 878
3712	774318.838	3786770.495	159.2	BLIND PROOF(2) 783
3724	744889.923	3803708.404	190.05	BLIND PROOF(2) 832
3728	756101.749	3805634.174	203.5	BLIND PROOF(2) 834
3733	775696.223	3796651.649	192.25	BLIND PROOF(2) 873
3735	739718.796	3817207.657	200.05	BLIND PROOF(2) 744
3745	733437.341	3801519.307	241.6	BLIND PROOF(2) 830
3748	723799.155	3815716.949	286	BLIND PROOF(2) 742
3754	717145.433	3828821.399	283.85	BLIND PROOF(2) 722
3757	716639.832	3841697.754	242.4	BLIND PROOF(2) 708
3759	729500.432	3842031.299	231.4	BLIND PROOF(2) 710
3768	726457.949	3825812.434	244.9	BLIND PROOF(2) 732
3771	735418.457	3830866.982	204.5	BLIND PROOF(2) 845
3778	751050.124	3813549.017	198.9	BLIND PROOF(2) 750
3780	749218.001	3824801.198	208.1	BLIND PROOF(2) 807
3784	750540.662	3835181.494	216.8	BLIND PROOF(2) 718
3789	737459.084	3848114.786	233.85	BLIND PROOF(2) 707
3793	710158.63	3834400.661	362	BLIND PROOF(2) 691
3802	725657.434	3859723.326	290.25	BLIND PROOF(2) 803
3807	709968.493	3852060.029	271.25	BLIND PROOF(2) 801
3810	720404.578	3851013.547	313.15	BLIND PROOF(2) 700
3818	690890.223	3842818.042	320.05	BLIND PROOF(2) 681
3822	695590.036	3851636.849	303.5	BLIND PROOF(2) 679
3828	703818.723	3841707.004	358.05	BLIND PROOF(2) 688
3836	697609.519	3860632.082	315.95	BLIND PROOF(2) 675





**Table 2**  
**DSM Elevation Values Compared to Surveyed Elevation Values**

ID	X	Y	QUAD_NAME	GridName	Z	DTM_Z	Z_Diff	PASS/ FAIL	UTM Zone
3007	409808.688	3949221.108	Reydon	35099F8_SW_B	752.95	752.798	0.152	PASS	14
3008	425784.625	3943396.615	Mackie	35099F7_SW_D	686.55	686.338	0.212	FAIL	14
3009	426835.707	3947416.75	Mackie	35099F7_SE_B	651.85	651.842	0.008	PASS	14
3016	415533.283	3960405.272	Durham	35099G8_SE_B	702.25	702.208	0.042	PASS	14
3018	432247.838	3946568.908	Cheyenne NW	35099F6_SW_B	617.9	617.669	0.231	FAIL	14
3019	425292.835	3965056.575	Crawford	35099G7_NW_D	725.95	725.906	0.044	PASS	14
3021	427568.328	3955414.563	Mackie	35099F7_NE_B	657.2	656.929	0.271	FAIL	14
3026	437239.029	3958543.596	Roll	35099G6_SW_D	698	697.895	0.105	PASS	14
3027	416075.516	3937933.318	Reydon SW	35099E8_NE_C	760.8	760.726	0.074	PASS	14
3033	420922.409	3941079.126	Dempsey	35099E7_NW_B	722.15	721.974	0.176	PASS	14
3035	438159.492	3929678.088	Cheyenne	35099E6_SE_C	707	706.864	0.136	PASS	14
3040	443823.915	3940872.401	Herring	35099E5_NW_B	590.65	590.568	0.082	PASS	14
3046	436531.238	3944105.592	Cheyenne NW	35099F6_SW_D	634.5	634.450	0.050	PASS	14
3052	432747.901	3937213.861	Cheyenne	35099E6_NW_C	646.4	646.332	0.068	PASS	14
3056	442042.699	3961366.172	Roll	35099G6_SE_A	688.15	688.039	0.111	PASS	14
3057	448461.662	3960112.178	Roll SE	35099G5_SW_A	691.3	691.197	0.103	PASS	14
3065	454770.648	3951365.319	Hammon	35099F4_NW_C	585	585.046	0.046	PASS	14
3067	456243.355	3940010.98	Big Kiowa Cre	35099E4_NW_B	547.6	547.558	0.042	PASS	14
3071	449263.099	3923172.693	Baker Lake	35099D5_NE_C	633.65	633.598	0.052	PASS	14
3072	449782.682	3936006.335	Herring	35099E5_NE_C	580.25	580.253	0.003	PASS	14
3074	462287.939	3944467.594	Hammon	35099F4_SE_C	549.45	549.451	0.001	PASS	14
3080	473909.016	3967976.523	Leedey	35099G3_NE_B	601.2	601.086	0.114	PASS	14
3083	461503.333	3967994.822	Leedey SW	35099G4_NE_B	641.8	641.683	0.117	PASS	14
3088	461148.536	3956818.24	Leedey SW	35099G4_SE_C	548.8	548.730	0.070	PASS	14
3090	473043.53	3940713.046	Carpenter	35099E3_NE_B	531.95	532.066	0.116	PASS	14
3097	478627.724	3931106.95	Foss Dam	35099E2_SW_C	527.8	527.740	0.060	PASS	14
3100	465903.809	3934293.451	Big Kiowa Cre	35099E4_SE_A	583.65	583.572	0.078	PASS	14
3102	458936.163	3927180.49	Elk City	35099D4_NW_A	649.2	649.106	0.094	PASS	14
3105	466956.316	3924705.378	Canute	35099D3_NW_C	598.35	598.277	0.073	PASS	14
3110	477246.79	3919864.968	Canute	35099D3_SE_A	542.15	542.165	0.015	PASS	14
3120	487780.631	3961540.899	Rhea	35099G2_SE_A	571.75	571.751	0.001	PASS	14
3124	494759.638	3955106.086	Anthon	35099F1_NE_B	531.05	531.037	0.013	PASS	14
3129	485161.541	3951111.797	Butler	35099F2_NE_C	508.3	508.302	0.002	PASS	14
3138	493172.878	3941340.515	Stafford	35099E1_NW_A	500	500.068	0.068	PASS	14
3140	504417.133	3941350.638	Clinton	35098E8_NW_A	507.2	507.183	0.017	PASS	14
3143	509212.216	3946261.17	Custer City	35098F8_SE_A	534.35	534.249	0.101	PASS	14
3145	503605.157	3951896.532	Custer City	35098F8_NW_D	541.8	541.833	0.033	PASS	14
3153	488645.497	3923035.922	Foss	35099D2_NE_D	532.8	532.935	0.135	PASS	14
3158	518163.447	3918202.125	Corn	35098D7_SE_C	477.6	477.620	0.020	PASS	14
3162	524593.246	3923916.369	Crowder Lake	35098D6_NW_C	523.25	523.215	0.035	PASS	14
3165	506955.534	3924631.311	Bessie	35098D8_NE_C	482.95	483.127	0.177	PASS	14
3169	510841.407	3935150.161	Clinton	35098E8_SE_A	514.65	514.537	0.113	PASS	14
3173	495354.252	3926358.923	Dill City NE	35099D1_NE_B	474.45	474.509	0.059	PASS	14
3176	515794.635	3906972.571	Cloud Chief	35098C7_SW_A	452.5	452.486	0.014	PASS	14



**Table 2**  
**DSM Elevation Values Compared to Surveyed Elevation Values**

ID	X	Y	QUAD_NAME	GridName	Z	DTM_Z	Z_Diff	PASS/ FAIL	UTM Zone
3182	510841.245	3893075.92	Gotebo NW	35098B8_SE_A	486.1	486.138	0.038	PASS	14
3186	503766.47	3898908.533	Gotebo NW	35098B8_NW_A	472.65	472.827	0.177	PASS	14
3188	503766.781	3910169.989	Cordell	35098C8_NW_D	463.65	463.797	0.147	PASS	14
3190	494180.148	3915016.875	Dill City NE	35099D1_SW_D	488.8	488.845	0.045	PASS	14
3193	487732.059	3906149.251	Dill City	35099C2_SE_A	573.8	573.771	0.029	PASS	14
3206	537951.096	3894950.153	Alfalfa	35098B5_NW_D	447.75	447.746	0.004	PASS	14
3208	525965.444	3894923.35	Cowden	35098B6_NW_D	448.6	448.654	0.054	PASS	14
3216	540586.564	3918199.809	Eakly NE	35098D5_SE_C	500.9	500.898	0.002	PASS	14
3221	526171.235	3911748.961	Colony	35098C6_NW_A	497.6	497.444	0.156	PASS	14
3236	503282.026	3876297.732	Gotebo West	35098A8_SW_D	454.75	454.625	0.125	PASS	14
3239	508160.395	3863483.837	Rainy Mountai	34098H8_SE_B	459.5	459.385	0.115	PASS	14
3245	521613.507	3855964.799	Cooperton	34098G7_NE_A	508.75	508.729	0.021	PASS	14
3251	527424.846	3871549.511	Bally Mountai	34098H6_NW_A	434.45	434.270	0.180	PASS	14
3255	526648.969	3865910.934	Bally Mountai	34098H6_SW_A	464.5	464.360	0.140	PASS	14
3260	544094.927	3886168.752	Carnegie	35098A5_NE_A	405.95	405.888	0.062	PASS	14
3266	544948.026	3874766.555	Carnegie	35098A5_SE_D	425.55	425.604	0.054	PASS	14
3270	532077.49	3883596.153	Stinking Creek	35098A6_NE_D	398.9	398.822	0.078	PASS	14
3274	515332.359	3876298.251	Gotebo East	35098A7_SW_D	424.95	425.041	0.091	PASS	14
3279	578227.59	3904015.065	Cogar	35098C2_SE_D	399.6	399.547	0.053	PASS	14
3281	567068.169	3903113.917	Binger	35098C3_SE_D	445.1	444.953	0.147	PASS	14
3285	545439.979	3908599.494	Eakly	35098C5_NE_D	464.6	464.643	0.043	PASS	14
3292	555061.031	3905467.023	Sickles	35098C4_SE_A	468.15	468.079	0.071	PASS	14
3295	557799.335	3916697.572	Hinton	35098D3_SW_C	436.4	436.272	0.128	PASS	14
3301	567769.453	3913520.846	Binger	35098C3_NE_A	494.8	494.862	0.062	PASS	14
3303	554740.678	3894243.853	Fort Cobb Dan	35098B4_SE_A	445.4	445.391	0.009	PASS	14
3307	573170.183	3891754.489	Anadarko NW	35098B2_SW_A	424.05	424.138	0.088	PASS	14
3310	574725.375	3874936.307	Anadarko East	35098A2_SE_C	377.9	377.925	0.025	PASS	14
3314	568815.915	3880575.176	Anadarko East	35098A2_SW_B	359.15	359.253	0.103	PASS	14
3324	557207.657	3883016.721	Anadarko Wes	35098A3_NW_C	378.35	378.422	0.072	PASS	14
3328	593602.688	3899331.842	Pocasset	35097B8_NW_B	365.6	365.819	0.219	FAIL	14
3334	578005.641	3884730.488	Anadarko East	35098A2_NE_A	350	350.162	0.162	PASS	14
3337	587544.725	3877480.687	Verden	35098A1_SE_B	350.4	350.483	0.083	PASS	14
3344	597036.153	3888914.999	Pocasset	35097B8_SE_C	344.75	344.755	0.005	PASS	14
3347	604848.534	3898705.536	Chickasha NE	35097B7_NW_B	381.05	381.214	0.164	PASS	14
3355	614695.526	3886713.651	Dibble	35097A6_NW_B	381.95	382.019	0.069	PASS	14
3358	604801.411	3876920.163	Tabler	35097A7_SW_C	325.25	325.314	0.064	PASS	14
3369	581202.552	3857327.251	Rocky Ford	34098G1_NW_B	400.8	400.998	0.198	FAIL	14
3372	592857.726	3854946.917	Rush Springs	34097G8_NW_C	409.05	409.036	0.014	PASS	14
3374	604107.554	3854407.232	East Roaring C	34097G7_NW_C	365.95	365.996	0.046	PASS	14
3379	603719.793	3865528.349	Alex	34097H7_SW_B	344.35	344.492	0.142	PASS	14
3383	586034.553	3866167.74	Laverty	34098H1_SE_B	382.75	382.807	0.057	PASS	14
3388	568396.081	3864478.827	Apache	34098H3_SE_A	420.75	420.781	0.031	PASS	14
3401	606571.363	3849053.818	East Roaring C	34097G7_SW_D	401.05	400.953	0.097	PASS	14
3409	613922.755	3838653.7	Bray	34097F7_SE_A	389.95	389.756	0.194	FAIL	14

**Table 2**  
**DSM Elevation Values Compared to Surveyed Elevation Values**

ID	X	Y	QUAD_NAME	GridName	Z	DTM_Z	Z_Diff	PASS/ FAIL	UTM Zone
3417	612458.361	3827130.328	Hope	34097E7_NE_D	349.8	349.786	0.014	PASS	14
3420	601623.996	3829703.178	Duncan North	34097E8_NE_A	374.15	374.087	0.063	PASS	14
3424	636668.714	3864453.721	Criner	34097H5_SE_A	334.7	334.707	0.007	PASS	14
3427	639221.419	3858899.529	Maysville	34097G4_NW_B	305.3	305.300	0.000	PASS	14
3433	617551.175	3859358.574	Lindsay SW	34097G6_NW_A	333.95	334.016	0.066	PASS	14
3437	614855.065	3870600.589	Bradley	34097H6_NW_C	348.1	348.154	0.054	PASS	14
3439	626024.208	3865911.594	Criner	34097H5_SW_B	358.8	358.643	0.157	PASS	14
3442	628653.118	3876133.397	Cole	35097A5_SW_D	372.1	372.095	0.005	PASS	14
3445	648008.217	3864633.309	Stealy	34097H4_SE_A	323.8	323.722	0.078	PASS	14
3449	663372.137	3857174.715	Byars SW	34097G2_NW_D	315.85	315.812	0.038	PASS	14
3459	632247.324	3851512.198	Lindsay	34097G5_SE_B	312.9	312.442	0.458	FAIL	14
3467	613143.078	3815103.158	Harrisburg	34097D7_NE_A	343.2	343.200	0.000	PASS	14
3472	628653.241	3819263.735	Pernell	34097E5_SW_C	320.1	320.176	0.076	PASS	14
3486	678536.732	3852218.621	Byars	34097G1_SE_B	332.25	332.264	0.014	PASS	14
3489	679711.947	3842576.326	Pauls Valley N	34097F1_NE_C	318.95	318.927	0.023	PASS	14
3497	664204.591	3847155.214	Byars SW	34097G2_SW_D	266.4	266.473	0.073	PASS	14
3506	634185.108	3829409.771	Pernell	34097E5_NE_B	326.8	326.705	0.095	PASS	14
3509	651858.156	3830877.004	Hennepin	34097E3_NW_A	284.5	284.477	0.023	PASS	14
3512	650871.372	3841342.613	Elmore City NE	34097F3_NW_C	305.6	305.632	0.032	PASS	14
3520	646412.49	3819513.668	Elmore City S	34097E4_SE_D	268.6	268.604	0.004	PASS	14
3524	648415.509	3797094.798	Fox	34097C4_SE_A	283.7	283.813	0.113	PASS	14
3529	635367.77	3807281.505	Ratliff City	34097D5_SE_D	317.8	317.889	0.089	PASS	14
3535	659303.728	3819728.277	Hennepin	34097E3_SE_D	308.85	308.813	0.037	PASS	14
3541	686311.59	3833033.318	Sulphur North	34096E8_NW_A	347.45	347.366	0.084	PASS	14
3550	669609.416	3825515.391	Joy	34097E2_SE_A	246.85	246.828	0.022	PASS	14
3562	691562.334	3809025.64	Sulphur South	34096D8_SE_C	315.9	316.023	0.123	PASS	14
3565	705863.018	3815713.615	Mill Creek	34096D7_NE_D	347.75	347.633	0.117	PASS	14
3583	659682.3	3796382.889	Milo	34097C3_SE_A	271.5	271.616	0.116	PASS	14
3584	677315.474	3797434.874	Gene Autry	34097C1_SW_A	256.55	256.582	0.032	PASS	14
3590	675982.714	3814351.641	Dougherty	34097D1_NW_D	286.6	286.502	0.098	PASS	14
3592	654724.71	3808584.499	Fox NE	34097D3_SW_D	392.25	392.317	0.067	PASS	14
3595	696193.861	3796171.925	Troy	34096C7_SW_B	282.8	282.906	0.106	PASS	14
3598	696676.119	3784260.133	Ravia	34096B7_SW_B	217.35	217.418	0.068	PASS	14
3602	686371.145	3787148.383	Mannsville	34096B8_NW_C	226.65	226.651	0.001	PASS	14
3611	714342.641	3797352.56	Reagan	34096C6_SE_B	247.75	247.672	0.078	PASS	14
3617	711833.209	3786285.065	Tishomingo	34096B6_NW_D	199.65	199.723	0.073	PASS	14
3625	724797.855	3786764.467	Milburn	34096B5_NE_C	225.15	225.058	0.092	PASS	14
3627	708428.114	3773927.163	Kingston North	34096A6_NW_C	231.65	231.696	0.046	PASS	14
3637	726203.273	3756462.241	Platter	33096H5_SE_B	196.6	196.526	0.074	PASS	14
3644	726040.765	3774879.928	Little City	34096A5_NE_C	209.5	209.435	0.065	PASS	14
3646	719543.415	3768532.769	Little City	34096A5_SW_B	212.7	212.816	0.116	PASS	14
3678	758956.054	3796033.665	Tushka	34096C2_SE_C	158.75	158.787	0.037	PASS	14
3690	735830.547	3779364.787	Caddo NW	34096B4_SW_D	212.7	212.716	0.016	PASS	14
3701	774554.56	3773879.999	Bennington N	34096A1_NE_D	213.4	213.458	0.058	PASS	14



**Table 2**  
**DSM Elevation Values Compared to Surveyed Elevation Values**

ID	X	Y	QUAD_NAME	GridName	Z	DTM_Z	Z_Diff	PASS/ FAIL	UTM Zone
3702	774401.637	3778719.26	Bennington Nd	34096A1_NE_A	191	190.936	0.064	PASS	14
3712	774318.838	3786770.495	Bentley	34096B1_SE_A	159.2	159.228	0.028	PASS	14
3724	744889.923	3803708.404	Boggy Depot	34096C3_NW_D	190.05	190.058	0.008	PASS	14
3728	756101.749	3805634.174	Tushka	34096C2_NW_A	203.5	203.481	0.019	PASS	14
3745	733437.341	3801519.307	Wapanucka S	34096C4_NW_D	241.6	241.649	0.049	PASS	14
3748	723799.155	3815716.949	Connerville NE	34096D5_NW_D	286	285.964	0.036	PASS	14
3754	717145.433	3828821.399	Fittstown	34096E6_NE_D	283.85	283.851	0.001	PASS	14
3757	716639.832	3841697.754	Ahloso	34096F6_NE_D	242.4	242.388	0.012	PASS	14
3759	729500.432	3842031.299	Lula	34096F4_NW_C	231.4	231.379	0.021	PASS	14
3768	726457.949	3825812.434	Harden City	34096E5_SE_B	244.9	244.933	0.033	PASS	14
3771	735418.457	3830866.982	Tupelo	34096E4_NE_C	204.5	204.488	0.012	PASS	14
3778	751050.124	3813549.017	Olney	34096D3_SE_A	198.9	198.732	0.168	PASS	14
3780	749218.001	3824801.198	Centrahoma	34096E3_SE_B	208.1	208.220	0.120	PASS	14
3784	750540.662	3835181.494	Tupelo NE	34096F3_SE_D	216.8	216.726	0.074	PASS	14
3789	737459.084	3848114.786	Lula	34096F4_NE_A	233.85	233.774	0.076	PASS	14
3793	710158.63	3834400.661	Ahloso	34096F6_SW_D	362	362.107	0.107	PASS	14
3802	725657.434	3859723.326	Francis	34096G5_NE_B	290.25	290.462	0.212	FAIL	14
3807	709968.493	3852060.029	Ada	34096G6_SW_A	271.25	271.407	0.157	PASS	14
3810	720404.578	3851013.547	Francis	34096G5_SW_D	313.15	313.079	0.071	PASS	14
3818	690890.223	3842818.042	Hart	34096F8_NE_C	320.05	320.072	0.022	PASS	14
3822	695590.036	3851636.849	Vanoss	34096G7_SW_B	303.5	303.586	0.086	PASS	14
3828	703818.723	3841707.004	Roff North	34096F7_NE_D	358.05	358.149	0.099	PASS	14
3836	697609.519	3860632.082	Vanoss	34096G7_NW_A	315.95	315.977	0.027	PASS	14
3647	697553.811	4018343.500	Pawnee	36096C7_SE_B	270.25	270.206	0.044	PASS	14
3651	708584.810	4029851.381	Skedee	36096D6_SE_C	262.3	262.123	0.177	PASS	14
3654	695721.560	3932996.206	Sparks	35096E7_SW_D	260.4	260.366	0.034	PASS	14
3657	697281.255	3941974.604	Sparks	35096E7_NW_A	249.7	249.468	0.232	FAIL	14
3662	342007.657	3923825.417	Gans	35094D6_NW_C	178	177.968	0.032	PASS	15
3667	312933.353	3841962.214	Albion	34095F1_NE_C	204.7	204.650	0.050	PASS	15

**RMSE<sub>(z)</sub> 0.101 meters**  
**Accuracy<sub>(z)</sub> 0.198 meters**

**DRAFT**

**APPENDIX A**

**Ground Survey Control**

DRAFT

**NGS Points Used for Base Setup**

## NGS POINTS USED FOR BASE SETUPS

GH1048 DESIGNATION - AUG .....	2
FJ0729 DESIGNATION - B 195 .....	5
EL0431 DESIGNATION - A 81 .....	8
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The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

GH1048 \*\*\*\*\*

GH1048 CBN - This is a Cooperative Base Network Control Station.

## GH1048 DESIGNATION - AUG

GH1048 PID - GH1048

GH1048 STATE/COUNTY- OK/PAWNEE

GH1048 USGS QUAD - MASHAM (1978)

GH1048

GH1048 \*CURRENT SURVEY CONTROL

GH1048

GH1048\* NAD 83(2007)- 36 24 21.79109(N) 096 52 15.12720(W) ADJUSTED

GH1048\* NAVD 88 - 318.9 (meters) 1046. (feet) GPS OBS

GH1048

GH1048 EPOCH DATE - 2002.00

GH1048 X - -614,863.347 (meters) COMP

GH1048 Y - -5,102,708.583 (meters) COMP

GH1048 Z - 3,764,721.549 (meters) COMP

GH1048 LAPLACE CORR- 0.52 (seconds) DEFLEC09

GH1048 ELLIP HEIGHT- 290.356 (meters) (02/10/07) ADJUSTED

GH1048 GEOID HEIGHT- -28.51 (meters) GEOID09

GH1048

GH1048 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

GH1048 Type PID Designation North East Ellip

GH1048 -----

GH1048 NETWORK GH1048 AUG 2.12 1.43 4.31

GH1048 -----

GH1048

GH1048.The horizontal coordinates were established by GPS observations

GH1048.and adjusted by the National Geodetic Survey in February 2007.

GH1048

GH1048.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

GH1048.See [National Readjustment](#) for more information.

GH1048.The horizontal coordinates are valid at the epoch date displayed above.

GH1048.The epoch date for horizontal control is a decimal equivalence

GH1048.of Year/Month/Day.

GH1048

GH1048.The orthometric height was determined by GPS observations and a

GH1048.high-resolution geoid model.

GH1048

GH1048.The X, Y, and Z were computed from the position and the ellipsoidal ht.

GH1048

GH1048.The Laplace correction was computed from DEFLEC09 derived deflections.

GH1048

GH1048.The ellipsoidal height was determined by GPS observations

GH1048.and is referenced to NAD 83.

GH1048

GH1048.The geoid height was determined by GEOID09.

GH1048

GH1048; North East Units Scale Factor Converg.

GH1048;SPC OK N - 156,595.919 701,275.251 MT 0.99995405 +0 39 58.9

GH1048;SPC OK N - 513,765.11 2,300,767.22 sFT 0.99995405 +0 39 58.9



GH1048;UTM 14 - 4,031,093.098 690,918.107 MT 1.00004911 +1 15 50.5

GH1048

GH1048! - Elev Factor x Scale Factor = Combined Factor

GH1048!SPC OK N - 0.99995443 x 0.99995405 = 0.99990848

GH1048!UTM 14 - 0.99995443 x 1.00004911 = 1.00000354

GH1048

GH1048 SUPERSEDED SURVEY CONTROL

GH1048

GH1048 ELLIP H (04/16/01) 290.354 (m) GP( ) 4 2

GH1048 NAD 83(1993)- 36 24 21.79086(N) 096 52 15.12705(W) AD( ) B

GH1048 ELLIP H (05/09/94) 290.410 (m) GP( ) 4 2

GH1048

GH1048.Superseded values are not recommended for survey control.

GH1048.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

GH1048.[See file dsdata.txt](#) to determine how the superseded data were derived.

GH1048

GH1048\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPF9091831093(NAD 83)

GH1048\_MARKER: DH = HORIZONTAL CONTROL DISK

GH1048\_SETTING: 66 = SET IN ROCK OUTCROP

GH1048\_SP\_SET: ROCK OUTCROP

GH1048\_STAMPING: AUG 1993

GH1048\_MARK LOGO: NGS

GH1048\_MAGNETIC: N = NO MAGNETIC MATERIAL

GH1048\_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD

GH1048+STABILITY: POSITION/ELEVATION WELL

GH1048\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

GH1048+SATELLITE: SATELLITE OBSERVATIONS - August 17, 2006

GH1048

GH1048 HISTORY - Date Condition Report By

GH1048 HISTORY - 1993 MONUMENTED NGS

GH1048 HISTORY - 20030926 GOOD OKDOT

GH1048 HISTORY - 20060817 GOOD OKDOT

GH1048

GH1048 STATION DESCRIPTION

GH1048

GH1048'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

GH1048'STATION IS LOCATED ABOUT 14 KM (8.70 MI) NORTHWEST OF PAWNEE, 17 KM

GH1048'(10.55 MI) SOUTHWEST OF RALSTON, ALONG STATE HIGHWAY 15, ON THE

GH1048'RIGHT-OF-WAY, AT THE HIGHEST SECTION OF HIGHWAY IN THE AREA, ADJACENT

GH1048'TO A PASTURE, AND ACROSS THE HIGHWAY AND SLIGHTLY WEST FROM AN OIL

GH1048'STORAGE FACILITY. OWNERSHIP--STATE DEPARTMENT OF TRANSPORTATION.

GH1048'TO REACH FROM THE JUNCTION OF STATE HIGHWAYS 15 AND 18, ABOUT 8 KM

GH1048'(4.95 MI) NORTH OF PAWNEE, GO WEST ON HIGHWAY 15 FOR 4.73 KM

GH1048'(2.95 MI) TO A GRAVEL CROSSROAD. CONTINUE AHEAD, WEST, FOR 1.56 KM

GH1048'(0.95 MI) TO THE STATION ON THE LEFT JUST BEFORE A METAL SHED.

GH1048'THE STATION IS SET FLUSH IN THE TOP APPROXIMATE CENTER OF A 4 M

GH1048'(13.1 FT) X 2 M (6.6 FT) AREA OF ROCK LEDGE. IT IS 8.2 M (26.9 FT)

GH1048'SOUTH OF, AND ABOUT 0.5 M (1.6 FT) HIGHER THAN THE HIGHWAY CENTER,

GH1048'35.3 M (115.8 FT) EAST OF THE NORTHEAST CORNER OF A METAL SHED, 32.8

GH1048'M (107.6 FT) SOUTHEAST, AND ACROSS THE ROAD OF THE CENTER OF A GRAVEL

GH1048'FIELD ENTRANCE, 25.2 M (82.7 FT) EAST OF THE WEST GATEPOST OF A GATE,

GH1048'3.5 M (11.5 FT) NORTH OF A FIBERGLASS WITNESS POST IN THE

GH1048'RIGHT-OF-WAY FENCE, AND 1.7 M (5.6 FT) SOUTH OF A STEEL WITNESS POST.

GH1048'DESCRIBED BY D.G. AUG

GH1048

GH1048 STATION RECOVERY (2003)

GH1048

GH1048'RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 2003 (GSR)  
GH1048'RECOVERED IN GOOD CONDITION.

GH1048

GH1048 STATION RECOVERY (2006)

GH1048

GH1048'RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 2006 (RDS)  
GH1048'RECOVERED IN GOOD CONDITION.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FJ0729 \*\*\*\*\*

**FJ0729 DESIGNATION - B 195**

FJ0729 PID - FJ0729

FJ0729 STATE/COUNTY- OK/LINCOLN

FJ0729 USGS QUAD - MEEKER (1974)

FJ0729

FJ0729 \*CURRENT SURVEY CONTROL

FJ0729

FJ0729\* NAD 83(2007)- 35 30 12.20853(N) 096 52 43.81776(W) NO CHECK

FJ0729\* NAVD 88 - 293.498 (meters) 962.92 (feet) ADJUSTED

FJ0729

FJ0729 EPOCH DATE - 2002.00

FJ0729 X - -622,614.319 (meters) COMP

FJ0729 Y - -5,160,989.194 (meters) COMP

FJ0729 Z - 3,683,628.726 (meters) COMP

FJ0729 LAPLACE CORR- -1.90 (seconds) DEFLEC09

FJ0729 ELLIP HEIGHT- 265.923 (meters) (02/10/07) NO CHECK

FJ0729 GEOID HEIGHT- -27.57 (meters) GEOID09

FJ0729 DYNAMIC HT - 293.222 (meters) 962.01 (feet) COMP

FJ0729

FJ0729 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FJ0729 Type PID Designation North East Ellip

FJ0729 -----

FJ0729 NETWORK FJ0729 B 195 1.29 0.98 3.59

FJ0729 -----

FJ0729 MODELED GRAV- 979,685.5 (mgal) NAVD 88

FJ0729

FJ0729 VERT ORDER - FIRST CLASS II

FJ0729

FJ0729.The horizontal coordinates were established by GPS observations

FJ0729.and adjusted by the National Geodetic Survey in February 2007.

FJ0729

FJ0729.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FJ0729.See [National Readjustment](#) for more information.

FJ0729.No horizontal observational check was made to the station.

FJ0729.The horizontal coordinates are valid at the epoch date displayed above.

FJ0729.The epoch date for horizontal control is a decimal equivalence

FJ0729.of Year/Month/Day.

FJ0729

FJ0729.The orthometric height was determined by differential leveling and

FJ0729.adjusted in August 1994.

FJ0729

FJ0729.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FJ0729

FJ0729.The Laplace correction was computed from DEFLEC09 derived deflections.

FJ0729

FJ0729.The ellipsoidal height was determined by GPS observations

FJ0729.and is referenced to NAD 83.

FJ0729

FJ0729.The geoid height was determined by GEOID09.

FJ0729

FJ0729.The dynamic height is computed by dividing the NAVD 88  
FJ0729.geopotential number by the normal gravity value computed on the  
FJ0729.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
FJ0729.degrees latitude (g = 980.6199 gals.).

FJ0729

FJ0729.The modeled gravity was interpolated from observed gravity values.

FJ0729

FJ0729;	North	East	Units	Scale	Factor	Converg.
FJ0729;SPC OK N	- 56,440.362	701,717.015	MT	1.00001209	+0 39 41.9	
FJ0729;SPC OK N	- 185,171.42	2,302,216.57	sFT	1.00001209	+0 39 41.9	
FJ0729;UTM 14	- 3,930,938.229	692,381.072	MT	1.00005611	+1 13 56.1	

FJ0729

FJ0729! - Elev Factor x Scale Factor = Combined Factor  
FJ0729!SPC OK N - 0.99995826 x 1.00001209 = 0.99997035  
FJ0729!UTM 14 - 0.99995826 x 1.00005611 = 1.00001437

FJ0729

FJ0729 SUPERSEDED SURVEY CONTROL

FJ0729

FJ0729 NAD 83(1993)- 35 30 12.20833(N) 096 52 43.81775(W) AD( ) 1  
FJ0729 ELLIP H (03/07/02) 265.926 (m) GP( ) 4 2  
FJ0729 NAVD 88 (06/15/91) 293.517 (m) 962.98 (f) UNKNOWN 1 2

FJ0729

FJ0729.Superseded values are not recommended for survey control.  
FJ0729.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.  
FJ0729.[See file dsdata.txt](#) to determine how the superseded data were derived.

FJ0729

FJ0729\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPE9238130938(NAD 83)  
FJ0729\_MARKER: DD = SURVEY DISK  
FJ0729\_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL  
FJ0729+WITH SETTING: INFORMATION.  
FJ0729\_SP\_SET: SHALLOW SET METAL ROD  
FJ0729\_STAMPING: B 195 1984  
FJ0729\_MARK LOGO: NGS  
FJ0729\_PROJECTION: FLUSH  
FJ0729\_MAGNETIC: I = MARKER IS A STEEL ROD  
FJ0729\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL  
FJ0729\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
FJ0729+SATELLITE: SATELLITE OBSERVATIONS - May 17, 2001  
FJ0729\_ROD/PIPE-DEPTH: 2.1 meters

FJ0729

FJ0729 HISTORY	- Date	Condition	Report By
FJ0729 HISTORY	- 1984	MONUMENTED	NGS
FJ0729 HISTORY	- 1988	GOOD	USPSQD
FJ0729 HISTORY	- 1989	GOOD	USPSQD
FJ0729 HISTORY	- 1990	GOOD	USPSQD
FJ0729 HISTORY	- 20010517	GOOD	MSAM

FJ0729

FJ0729 STATION DESCRIPTION

FJ0729

FJ0729'DESCRIBED BY NATIONAL GEODETIC SURVEY 1984  
FJ0729'2.3 KM (1.45 MI) EAST FROM MEEKER.  
FJ0729'2.3 KM (1.45 MI) EAST ALONG U.S. HIGHWAY 62 FROM THE POST OFFICE IN  
FJ0729'MEEKER, AT A T-JUNCTION FENCE LEADING NORTH, 17.80 METERS (58.4 FT)  
FJ0729'NORTH OF THE CENTERLINE OF THE HIGHWAY, AND 0.45 METERS (1.5 FT) SOUTH  
FJ0729'OF T-JUNCTION FENCE.

FJ0729'THE MARK IS 0.3 METERS W FROM A WITNESS POST.

FJ0729'THE MARK IS 0.3 M ABOVE HIGHWAY.

FJ0729

FJ0729 STATION RECOVERY (1988)

FJ0729

FJ0729'RECOVERY NOTE BY US POWER SQUADRON 1988 (MS)

FJ0729'RECOVERED IN GOOD CONDITION.

FJ0729

FJ0729 STATION RECOVERY (1989)

FJ0729

FJ0729'RECOVERY NOTE BY US POWER SQUADRON 1989 (MS)

FJ0729'RECOVERED IN GOOD CONDITION.

FJ0729

FJ0729 STATION RECOVERY (1990)

FJ0729

FJ0729'RECOVERY NOTE BY US POWER SQUADRON 1990 (TWS)

FJ0729'RECOVERED IN GOOD CONDITION.

FJ0729

FJ0729 STATION RECOVERY (2001)

FJ0729

FJ0729'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 2001 (KCH)

FJ0729'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING, INC. MSAM 2001

(KCH)

FJ0729'RECOVERED AS DESCRIBED.

FJ0729'

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL0431 \*\*\*\*\*

**EL0431 DESIGNATION - A 81**

EL0431 PID - EL0431

EL0431 STATE/COUNTY- OK/CARTER

EL0431 USGS QUAD - GENE AUTRY (1978)

EL0431

EL0431 \*CURRENT SURVEY CONTROL

EL0431

EL0431\* NAD 83(1993)- 34 17 59.77060(N) 097 02 17.79046(W) ADJUSTED

EL0431\* NAVD 88 - 232.441 (meters) 762.60 (feet) ADJUSTED

EL0431

EL0431 X - -646,327.917 (meters) COMP

EL0431 Y - -5,235,004.900 (meters) COMP

EL0431 Z - 3,574,096.909 (meters) COMP

EL0431 LAPLACE CORR- 1.28 (seconds) DEFLEC09

EL0431 ELLIP HEIGHT- 207.100 (meters) (11/28/94) ADJUSTED

EL0431 GEOID HEIGHT- -25.67 (meters) GEOID09

EL0431 DYNAMIC HT - 232.206 (meters) 761.83 (feet) COMP

EL0431 MODELED GRAV- 979,618.5 (mgal) NAVD 88

EL0431

EL0431 HORZ ORDER - SECOND

EL0431 VERT ORDER - SECOND CLASS 0

EL0431 ELLP ORDER - FIFTH CLASS I

EL0431

EL0431.The horizontal coordinates were established by GPS observations

EL0431.and adjusted by the National Geodetic Survey in November 1994.

EL0431

EL0431.The orthometric height was determined by differential leveling and

EL0431.adjusted in June 1991.

EL0431

EL0431.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL0431

EL0431.The Laplace correction was computed from DEFLEC09 derived deflections.

EL0431

EL0431.The ellipsoidal height was determined by GPS observations

EL0431.and is referenced to NAD 83.

EL0431

EL0431.The geoid height was determined by GEOID09.

EL0431

EL0431.The dynamic height is computed by dividing the NAVD 88

EL0431.geopotential number by the normal gravity value computed on the

EL0431.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

EL0431.degrees latitude (g = 980.6199 gals.).

EL0431

EL0431.The modeled gravity was interpolated from observed gravity values.

EL0431

EL0431; North East Units Scale Factor Converg.

EL0431;SPC OK S - 107,640.390 688,529.326 MT 0.99994818 +0 32 45.2

EL0431;SPC OK S - 353,150.18 2,258,949.96 sFT 0.99994818 +0 32 45.2

EL0431;UTM 14 - 3,797,155.182 680,534.808 MT 1.00000177 +1 06 20.8

EL0431  
 EL0431! - Elev Factor x Scale Factor = Combined Factor  
 EL0431!SPC OK S - 0.99996749 x 0.99994818 = 0.99991567  
 EL0431!UTM 14 - 0.99996749 x 1.00000177 = 0.99996926  
 EL0431  
 EL0431 SUPERSEDED SURVEY CONTROL  
 EL0431  
 EL0431 NAD 83(1986)- 34 17 59.77194(N) 097 02 17.77897(W) AD( ) 2  
 EL0431 NGVD 29 (??/??/92) 232.390 (m) 762.43 (f) ADJ UNCH 2 0  
 EL0431  
 EL0431.Superseded values are not recommended for survey control.  
 EL0431.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.  
 EL0431.[See file dsdata.txt](#) to determine how the superseded data were derived.  
 EL0431  
 EL0431\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPC8053497155(NAD 83)  
 EL0431\_MARKER: DB = BENCH MARK DISK  
 EL0431\_SETTING: 34 = SET IN THE FOOTINGS OF SMALL/MEDIUM STRUCTURES  
 EL0431\_SP\_SET: HEADWALL  
 EL0431\_STAMPING: A 81 1945  
 EL0431\_MARK LOGO: CGS  
 EL0431\_MAGNETIC: N = NO MAGNETIC MATERIAL  
 EL0431\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO  
 EL0431+STABILITY: SURFACE MOTION  
 EL0431\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
 EL0431+SATELLITE: SATELLITE OBSERVATIONS - January 26, 2009  
 EL0431  
 EL0431 HISTORY - Date Condition Report By  
 EL0431 HISTORY - 1945 MONUMENTED CGS  
 EL0431 HISTORY - 19890301 GOOD NGS  
 EL0431 HISTORY - 20010220 GOOD INDIV  
 EL0431 HISTORY - 20030625 GOOD ALMLS  
 EL0431 HISTORY - 20090126 GOOD AIRDAT  
 EL0431  
 EL0431 STATION DESCRIPTION  
 EL0431  
 EL0431'DESCRIBED BY COAST AND GEODETIC SURVEY 1945  
 EL0431'1.1 MI N FROM GENE AUTRY.  
 EL0431'ABOUT 1.1 MILES NORTH ALONG GRAVELED ROAD FROM THE POST OFFICE  
 EL0431'AT GENE AUTRY, 118.0 FEET NORTHWEST OF GATEHOUSE NO. 2-214 AT  
 EL0431'THE WEST AND MAIN GATE TO ARDMORE ARMY AIR FIELD, 33.0 FEET  
 EL0431'NORTH OF THE CENTER LINE OF ASPHALT ROAD AND 38.0 FEET WEST OF  
 EL0431'THE CENTER LINE OF GRAVELED ROAD. AN IRON DISK STAMPED A 81  
 EL0431'1945 SET IN A DRILL HOLE ON TOP OF THE EAST END OF THE NORTH  
 EL0431'CONCRETE HEADWALL OF A TUBE CULVERT.  
 EL0431  
 EL0431 STATION RECOVERY (1989)  
 EL0431  
 EL0431'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1989  
 EL0431'THE STATION WAS RECOVERED IN GOOD CONDITION, A COMPLETE DESCRIPTION  
 EL0431'FOLLOWS.  
 EL0431'THE STATION IS LOCATED ABOUT 23.6 KM (14.65 MI) SOUTHEAST OF DAVIS,  
 EL0431'19.5 KM (12.10 MI) NORTHWEST OF MANNSVILLE, AND 16.7 KM (10.40 MI)  
 EL0431'NORTHEAST OF ARDMORE. OWNERSHIP--STATE HIGHWAY DEPARTMENT.  
 EL0431'TO REACH THE STATION FROM THE POST OFFICE IN SPRINGER, GO SOUTH ON  
 EL0431'U.S. HIGHWAY 77 FOR 1.0 KM (0.60 MI) TO A PAVED CROSSROAD. TURN LEFT  
 EL0431'AND GO EAST ON STATE HIGHWAY 53 FOR 9.8 KM (6.10 MI) TO THE STATION ON

EL0431 THE LEFT JUST BEFORE TURNING SOUTH ON THE HIGHWAY AT THE ENTRANCE TO  
EL0431 THE ARDMORE INDUSTRIAL AIRPARK.

EL0431 THE STATION IS A STANDARD CGS DISK SET IN THE TOP OF THE EAST END OF  
EL0431 THE NORTH HEADWALL OF A 1.2 BY 1.2 METER CONCRETE BOX CULVERT UNDER  
EL0431 THE HIGHWAY AND IS FLUSH WITH THE GROUND. LOCATED 10.7 M (35.1 FT)  
EL0431 NORTH OF THE CENTERLINE OF THE HIGHWAY, 10.6 M (34.8 FT) WEST OF THE  
EL0431 CENTER OF A PAVED ROAD, 0.3 M (1.0 FT) WEST OF THE EAST END OF THE  
EL0431 HEADWALL, AND 1.2 M (3.9 FT) EAST OF A CARSONITE WITNESS POST.

EL0431 DESCRIBED BY E.J. HANSMANN, TYPED BY RLZ.

EL0431

EL0431 STATION RECOVERY (2001)

EL0431

EL0431 RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2001 (DLH)

EL0431 RECOVERED IN GOOD CONDITION.

EL0431

EL0431 STATION RECOVERY (2003)

EL0431

EL0431 RECOVERY NOTE BY AL MORRIS LAND SURVEYING 2003 (ALM)

EL0431 RECOVERED AS DESCRIBED.

EL0431

EL0431 STATION RECOVERY (2009)

EL0431

EL0431 RECOVERY NOTE BY AERIAL DATA SERVICE INCORPORATED 2009 (JJH)

EL0431 RECOVERED IN GOOD CONDITION.



The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0639 \*\*\*\*\*

FK0639 FBN - This is a Federal Base Network Control Station.

**FK0639 DESIGNATION - COGAR**

FK0639 PID - FK0639

FK0639 STATE/COUNTY- OK/CADDO

FK0639 USGS QUAD - COGAR (1967)

FK0639

FK0639 \*CURRENT SURVEY CONTROL

FK0639

FK0639\* NAD 83(2007)- 35 20 02.31089(N) 098 10 07.55828(W) ADJUSTED

FK0639\* NAVD 88 - 484.721 (meters) 1590.29 (feet) ADJUSTED

FK0639

FK0639 EPOCH DATE - 2002.00

FK0639 X - -740,208.726 (meters) COMP

FK0639 Y - -5,156,603.441 (meters) COMP

FK0639 Z - 3,668,421.065 (meters) COMP

FK0639 LAPLACE CORR- -0.07 (seconds) DEFLEC09

FK0639 ELLIP HEIGHT- 457.680 (meters) (02/10/07) ADJUSTED

FK0639 GEOID HEIGHT- -27.04 (meters) GEOID09

FK0639 DYNAMIC HT - 484.234 (meters) 1588.69 (feet) COMP

FK0639

FK0639 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FK0639 Type PID Designation North East Ellip

FK0639 -----

FK0639 NETWORK FK0639 COGAR 0.35 0.29 0.86

FK0639 -----

FK0639 MODELED GRAV- 979,613.6 (mgal) NAVD 88

FK0639

FK0639 VERT ORDER - FIRST CLASS II

FK0639

FK0639.The horizontal coordinates were established by GPS observations

FK0639.and adjusted by the National Geodetic Survey in February 2007.

FK0639

FK0639.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FK0639.See [National Readjustment](#) for more information.

FK0639.The horizontal coordinates are valid at the epoch date displayed above.

FK0639.The epoch date for horizontal control is a decimal equivalence

FK0639.of Year/Month/Day.

FK0639

FK0639.The orthometric height was determined by differential leveling and

FK0639.adjusted in August 1994.

FK0639

FK0639.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0639

FK0639.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0639

FK0639.The ellipsoidal height was determined by GPS observations

FK0639.and is referenced to NAD 83.

FK0639

FK0639.The geoid height was determined by GEOID09.

FK0639

FK0639.The dynamic height is computed by dividing the NAVD 88  
FK0639.geopotential number by the normal gravity value computed on the  
FK0639.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
FK0639.degrees latitude ( $g = 980.6199$  gals.).

FK0639

FK0639.The modeled gravity was interpolated from observed gravity values.

FK0639

FK0639;	North	East	Units	Scale Factor	Converg.
FK0639;SPC OK S	- 221,940.054	584,656.181	MT	1.00002144	-0 05 44.9
FK0639;SPC OK S	- 728,148.33	1,918,159.49	sFT	1.00002144	-0 05 44.9
FK0639;UTM 14	- 3,910,397.604	575,542.863	MT	0.99967033	+0 28 50.7

FK0639

FK0639! - Elev Factor x Scale Factor = Combined Factor

FK0639!SPC OK S - 0.99992817 x 1.00002144 = 0.99994961

FK0639!UTM 14 - 0.99992817 x 0.99967033 = 0.99959852

FK0639

FK0639

## SUPERSEDED SURVEY CONTROL

FK0639

FK0639	ELLIP H (06/09/00)	457.687 (m)	GP( ) 2 2
FK0639	NAD 83(1993)-	35 20 02.31092(N)	098 10 07.55825(W) AD( ) B
FK0639	ELLIP H (05/09/94)	457.722 (m)	GP( ) 4 2
FK0639	NAVD 88 (01/13/95)	484.72 (m)	1590.3 (f) LEVELING 3

FK0639

FK0639.Superseded values are not recommended for survey control.

FK0639.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0639.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0639

FK0639\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE7554210397(NAD 83)

FK0639\_MARKER: I = METAL ROD

FK0639\_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL  
FK0639+WITH SETTING; INFORMATION.

FK0639\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

FK0639\_STAMPING: COGAR 1993

FK0639\_MARK LOGO: NGS

FK0639\_PROJECTION: RECESSED 1 CENTIMETERS

FK0639\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0639\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

FK0639\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0639+SATELLITE: SATELLITE OBSERVATIONS - March 02, 2006

FK0639\_ROD/PIPE-DEPTH: 2.90 meters

FK0639\_SLEEVE-DEPTH : 0.9 meters

FK0639

FK0639 HISTORY	- Date	Condition	Report By
FK0639 HISTORY	- 1993	MONUMENTED	NGS
FK0639 HISTORY	- 19940210	GOOD	NGS
FK0639 HISTORY	- 19990819	GOOD	NGS
FK0639 HISTORY	- 20060302	GOOD	OKDOT

FK0639

FK0639

## STATION DESCRIPTION

FK0639

FK0639'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

FK0639'STATION IS LOCATED ABOUT 28 KM (17.40 MI) NORTH-NORTHEAST OF  
ANADARKO,

FK0639'16 KM (9.95 MI) EAST OF BINGER, 1.9 KM (1.20 MI) WEST OF COGAR, ALONG

FK0639'STATE HIGHWAY 152, ON THE RIGHT-OF-WAY, IN A LAWN AREA ALONG A LOW

FK0639'CHAINLINK FENCE IN FRONT OF A TAN BRICK HOUSE, NEAR THE NORTHEAST  
FK0639'CORNER OF SECTION 20, T 10 N, R 9 W. OWNERSHIP--OKLAHOMA DEPARTMENT  
FK0639'OF TRANSPORTATION.

FK0639'TO REACH FROM THE JUNCTION OF US HIGHWAY 281 AND STATE HIGHWAYS 8  
AND

FK0639'152 (7 KM EAST OF BINGER), GO EAST ON HIGHWAY 152 FOR 10.84 KM  
FK0639'(6.75 MI) TO A PRIVATE GRAVEL ROAD ON THE LEFT AT TOP OF RISE.

FK0639'CONTINUE AHEAD, EAST, ON HIGHWAY 152 FOR 0.08 KM (0.05 MI) TO THE  
FK0639'STATION ON THE RIGHT.

FK0639'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN A  
FK0639'2.5 CM GREASE FILLED SLEEVE 90 CM LONG ENCASED IN A 12.7 CM PVC PIPE  
FK0639'WITH LOGO CAP SURROUNDED BY CONCRETE SET 1 CM BELOW GROUND. IT IS  
FK0639'18.8 M (61.7 FT) SOUTH FROM, AND LEVEL WITH THE HIGHWAY CENTER, 55.6  
FK0639'M (182.4 FT) WEST FROM THE DRIVEWAY CENTER, 30.7 M (100.7 FT) WEST  
FK0639'FROM A POWERLINE POLE WITH TRANSFORMER, 4.7 M (15.4 FT) EAST FROM A  
FK0639'T-FENCE CORNER, AND 0.6 M (2.0 FT) NORTH FROM A FIBERGLASS WITNESS  
FK0639'POST IN THE FENCE LINE.

FK0639'DESCRIBED BY D.G. AUG

FK0639

FK0639 STATION RECOVERY (1994)

FK0639

FK0639'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1994

FK0639'0.1 KM (0.05 MI) EASTERLY ALONG MAIN STREET FROM THE POST OFFICE IN  
FK0639'MINCO, THENCE 2.3 KM (1.40 MI) NORTHERLY ALONG U.S. HIGHWAY 81,  
FK0639'THENCE 20.8 KM (12.90 MI) WESTERLY ALONG STATE HIGHWAY 152, 55.6 M  
FK0639'(182.4 FT) WEST OF THE CENTER OF A DRIVEWAY, 30.6 M (100.4 FT) WEST  
FK0639'OF A UTILITY POLE WITH A TRANSFORMER, 18.8 M (61.7 FT) SOUTH OF AND  
FK0639'LEVEL WITH THE HIGHWAY CENTERLINE, 4.8 M (15.7 FT) EAST OF A T FENCE  
FK0639'CORNER, 0.6 M (2.0 FT) NORTH OF A CHAIN-LINK FENCE, AND NEAR THE  
FK0639'CENTER OF 3 WITNESS POSTS. NOTE--ACCESS TO THE DATUM POINT IS  
FK0639'THROUGH A 5-INCH LOGO CAP. THE SLEEVE DEPTH DOES NOT MEET THE  
FK0639'SPECIFICATIONS FOR A CLASS A MARK.

FK0639

FK0639 STATION RECOVERY (1999)

FK0639

FK0639'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (CSM)

FK0639'THE STATION IS LOCATED ABOUT 24.14 KM (15.00 MI) EAST OF MINCO, ABOUT  
FK0639'16 KM (9.95 MI) EAST OF BINGER, 3.5 KM (2.15 MI) WEST OF THE JUNCTION  
FK0639'OF STATE HIGHWAY 37 NORTH AND STATE HIGHWAY 152, ON THE SOUTH SIDE OF  
FK0639'STATE HIGHWAY 152 RIGHT-OF-WAY. OWNERSHIP--OKLAHOMA DEPARTMENT OF  
FK0639'TRANSPORTATION. TO REACH THE STATION FROM THE JUNCTION OF  
INTERSTATE

FK0639'HIGHWAY 40 AND COMBINED STATE HIGHWAYS 37 AND 152, GO WEST ON  
HIGHWAY

FK0639'37/152 FOR 17.4 KM (10.80 MI) TO THE JUNCTION OF STATE HIGHWAY 37

FK0639'LEADING NORTH. CONTINUE AHEAD, WEST ON HIGHWAY 152 FOR 3.38 KM (2.10

FK0639'MI) TO A GRAVEL ENTRANCE DRIVE WITH ARCHED GATE (RUMEY), LEADING TO A  
FK0639'SINGLE STORY TAN BRICK HOUSE WITH METAL GARAGE. CONTINUE AHEAD,

WEST

FK0639'FOR ABOUT 0.08 KM (0.05 MI) TO THE NORTHWEST CORNER OF THE CHAIN LINK  
FK0639'FENCE AROUND THE PROPERTY AND THE STATION ON THE LEFT. THE STATION IS  
FK0639'A PUNCH MARK ON THE TOP OF A STAINLESS STEEL ROD IN A GREASE-FILLED  
FK0639'SLEEVE, ENCASED IN A 13 CM PVC PIPE WITH AN NGS LOGO CAP SURROUNDED BY  
FK0639'CONCRETE FLUSH WITH THE GROUND AND ABOUT LEVEL WITH THE HIGHWAY.

FK0639'LOCATED 55.63 M (182.51 FT) WEST OF THE CENTER OF THE ENTRANCE DRIVE,

FK0639'18.75 M (61.52 FT) SOUTH OF THE CENTER OF THE HIGHWAY, 4.58 M (15.03

FK0639'FT) EAST OF THE NORTHWEST CORNER POST OF THE CHAIN LINK FENCE,  
BETWEEN

FK0639'2 OKDOT METAL WITNESS POSTS AND 0.6 M (2.0 FT) NORTH OF AN NGS

FK0639'FIBERGLASS WITNESS POST SET IN THE FENCE LINE.

FK0639

FK0639

STATION RECOVERY (2006)

FK0639

FK0639'RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 2006 (JGT)

FK0639'RECOVERD AS DESCRIBED

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EM1085 \*\*\*\*\*

EM1085 CBN - This is a Cooperative Base Network Control Station.

## EM1085 DESIGNATION - 21 K 35

EM1085 PID - EM1085

EM1085 STATE/COUNTY- OK/KIOWA

EM1085 USGS QUAD - RAINY MTN CREEK (1991)

EM1085

EM1085 \*CURRENT SURVEY CONTROL

EM1085

EM1085\* NAD 83(2007)- 34 53 57.10476(N) 098 57 41.58239(W) ADJUSTED

EM1085\* NAVD 88 - 483.2 (meters) 1585. (feet) GPS OBS

EM1085

EM1085 EPOCH DATE - 2002.00

EM1085 X - -815,808.480 (meters) COMP

EM1085 Y - -5,173,278.430 (meters) COMP

EM1085 Z - 3,628,962.374 (meters) COMP

EM1085 LAPLACE CORR- 0.60 (seconds) DEFLEC09

EM1085 ELLIP HEIGHT- 457.642 (meters) (02/10/07) ADJUSTED

EM1085 GEOID HEIGHT- -25.52 (meters) GEOID09

EM1085

EM1085 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EM1085 Type PID Designation North East Ellip

EM1085 -----

EM1085 NETWORK EM1085 21 K 35 1.25 1.10 2.90

EM1085 -----

EM1085

EM1085.The horizontal coordinates were established by GPS observations

EM1085.and adjusted by the National Geodetic Survey in February 2007.

EM1085

EM1085.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EM1085.See [National Readjustment](#) for more information.

EM1085.The horizontal coordinates are valid at the epoch date displayed above.

EM1085.The epoch date for horizontal control is a decimal equivalence

EM1085.of Year/Month/Day.

EM1085

EM1085.The orthometric height was determined by GPS observations and a

EM1085.high-resolution geoid model.

EM1085

EM1085.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EM1085

EM1085.The Laplace correction was computed from DEFLEC09 derived deflections.

EM1085

EM1085.The ellipsoidal height was determined by GPS observations

EM1085.and is referenced to NAD 83.

EM1085

EM1085.The geoid height was determined by GEOID09.

EM1085

EM1085; North East Units Scale Factor Converg.

EM1085;SPC OK S - 174,111.079 512,119.922 MT 0.99995101 -0 32 44.9

EM1085;SPC OK S - 571,229.43 1,680,180.11 sFT 0.99995101 -0 32 44.9

EM1085;UTM 14 - 3,861,865.026 503,512.863 MT 0.99960015 +0 01 19.2

EM1085

EM1085! - Elev Factor x Scale Factor = Combined Factor

EM1085!SPC OK S - 0.99992817 x 0.99995101 = 0.99987918

EM1085!UTM 14 - 0.99992817 x 0.99960015 = 0.99952835

EM1085

EM1085 SUPERSEDED SURVEY CONTROL

EM1085

EM1085 ELLIP H (04/16/01) 457.655 (m) GP( ) 4 2

EM1085 NAD 83(1993)- 34 53 57.10475(N) 098 57 41.58216(W) AD( ) B

EM1085 ELLIP H (05/09/94) 457.694 (m) GP( ) 4 2

EM1085

EM1085.Superseded values are not recommended for survey control.

EM1085.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EM1085.[See file dsdata.txt](#) to determine how the superseded data were derived.

EM1085

EM1085\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SND0351261865(NAD 83)

EM1085\_MARKER: DB = BENCH MARK DISK

EM1085\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

EM1085\_SP\_SET: SQUARE CONCRETE MONUMENT

EM1085\_STAMPING: NO. 21 K 35 TT 1935

EM1085\_MARK LOGO: CGS

EM1085\_MAGNETIC: N = NO MAGNETIC MATERIAL

EM1085\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

EM1085+STABILITY: SURFACE MOTION

EM1085\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EM1085+SATELLITE: SATELLITE OBSERVATIONS - April 07, 1993

EM1085

EM1085 HISTORY - Date Condition Report By

EM1085 HISTORY - UNK MONUMENTED

EM1085 HISTORY - 19930407 GOOD NGS

EM1085

EM1085 STATION DESCRIPTION

EM1085

EM1085'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

EM1085'STATION IS LOCATED ABOUT 27 KM (16.75 MI) NORTH OF SNYDER, 8 KM

EM1085'(4.95 MI) NORTHEAST OF ROOSEVELT, ALONG A PAVED ROAD, JUST WEST OF A

EM1085'SERIES OF ROAD CURVES, IN A PASTURE WITH MESQUITE TREES, ACROSS ROAD

EM1085'FROM A ROCK-COVERED HILL, IN THE NORTHEAST 1/4 OF SECTION 14, T 5 N,

EM1085'R 17 W. OWNERSHIP--LEON JONES, 326 WICHITA STREET, PO BOX 6,

EM1085'ROOSEVELT, OK 73564. PHONE IS 405-639-2477.

EM1085'TO REACH FROM THE JUNCTION OF US HIGHWAY 183 AND STATE HIGHWAY 19 AT

EM1085'ROOSEVELT, GO NORTHWEST ON HIGHWAY 183 FOR 5.20 KM (3.25 MI) TO A

EM1085'CROSSROAD. TURN RIGHT, EAST, ON PAVED ROAD FOR 6.36 KM (3.95 MI) TO

EM1085'A DIRT CROSSROAD. CONTINUE AHEAD FOR 0.98 KM (0.60 MI) TO THE

EM1085'STATION ON THE RIGHT AT A FIELD ENTRANCE, 0.17 KM (0.10 MI) BEFORE

EM1085'REACHING A ROAD CURVE.

EM1085'STATION MARK IS A USCGS AND STATE SURVEY DISK SET IN THE TOP OF A

EM1085'15-CM SQUARE CONCRETE POST PROJECTING 12 CM ABOVE GROUND. IT IS 19.5

EM1085'M (64.0 FT) SOUTH OF, AND LEVEL WITH, THE ROAD CENTER, 10.2 M

EM1085'(33.5 FT) SOUTH OF THE PASTURE FENCE, 0.9 M (3.0 FT) NORTH OF A METAL

EM1085'WITNESS POST, 1.2 M (3.9 FT) EAST OF A METAL WITNESS POST, AND 35.4 M

EM1085'(116.1 FT) WEST-SOUTHWEST OF THE WEST GATEPOST AT FIELD ENTRANCE.

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0637 \*\*\*\*\*

FK0637 FBN - This is a Federal Base Network Control Station.

**FK0637 DESIGNATION - 57 WHV**

FK0637 PID - FK0637

FK0637 STATE/COUNTY- OK/ROGER MILLS

FK0637 USGS QUAD - REYDON (1989)

FK0637

FK0637 \*CURRENT SURVEY CONTROL

FK0637

FK0637\* NAD 83(2007)- 35 44 27.35460(N) 099 58 52.50301(W) ADJUSTED

FK0637\* NAVD 88 - 712.5 (meters) 2338. (feet) GPS OBS

FK0637

FK0637 EPOCH DATE - 2002.00

FK0637 X - -898,417.102 (meters) COMP

FK0637 Y - -5,104,944.531 (meters) COMP

FK0637 Z - 3,705,297.872 (meters) COMP

FK0637 LAPLACE CORR- -0.45 (seconds) DEFLEC09

FK0637 ELLIP HEIGHT- 684.396 (meters) (02/10/07) ADJUSTED

FK0637 GEOID HEIGHT- -28.11 (meters) GEOID09

FK0637

FK0637 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FK0637 Type PID Designation North East Ellip

FK0637 -----

FK0637 NETWORK FK0637 57 WHV 0.43 0.33 0.98

FK0637 -----

FK0637

FK0637.The horizontal coordinates were established by GPS observations

FK0637.and adjusted by the National Geodetic Survey in February 2007.

FK0637

FK0637.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FK0637.See [National Readjustment](#) for more information.

FK0637.The horizontal coordinates are valid at the epoch date displayed above.

FK0637.The epoch date for horizontal control is a decimal equivalence

FK0637.of Year/Month/Day.

FK0637

FK0637.The orthometric height was determined by GPS observations and a

FK0637.high-resolution geoid model.

FK0637

FK0637.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0637

FK0637.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0637

FK0637.The ellipsoidal height was determined by GPS observations

FK0637.and is referenced to NAD 83.

FK0637

FK0637.The geoid height was determined by GEOID09.

FK0637

FK0637; North East Units Scale Factor Converg.

FK0637;SPC OK N - 84,036.956 420,797.970 MT 0.99997294 -1 10 09.2

FK0637;SPC OK N - 275,711.25 1,380,568.01 sFT 0.99997294 -1 10 09.2

FK0637;UTM 14 - 3,955,658.455 411,272.459 MT 0.99969701 -0 34 23.5

FK0637

FK0637! - Elev Factor x Scale Factor = Combined Factor

FK0637!SPC OK N - 0.99989259 x 0.99997294 = 0.99986554

FK0637!UTM 14 - 0.99989259 x 0.99969701 = 0.99958964

FK0637

FK0637 SUPERSEDED SURVEY CONTROL

FK0637

FK0637 ELLIP H (06/09/00) 684.388 (m) GP( ) 2 2

FK0637 NAD 83(1993)- 35 44 27.35438(N) 099 58 52.50250(W) AD( ) B

FK0637 ELLIP H (05/09/94) 684.417 (m) GP( ) 4 2

FK0637

FK0637.Superseded values are not recommended for survey control.

FK0637.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0637.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0637

FK0637\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME1127255658(NAD 83)

FK0637\_MARKER: DB = BENCH MARK DISK

FK0637\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0637\_SP\_SET: SQUARE CONCRETE MONUMENT

FK0637\_STAMPING: 57 WHV 1959 2337

FK0637\_MARK LOGO: USGS

FK0637\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0637\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0637+STABILITY: SURFACE MOTION

FK0637\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0637+SATELLITE: SATELLITE OBSERVATIONS - August 19, 1999

FK0637

FK0637 HISTORY - Date Condition Report By

FK0637 HISTORY - UNK MONUMENTED

FK0637 HISTORY - 19930517 GOOD NGS

FK0637 HISTORY - 19990819 GOOD NGS

FK0637

FK0637 STATION DESCRIPTION

FK0637

FK0637'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

FK0637'STATION IS LOCATED ABOUT 11 KM (6.85 MI) NORTHWEST OF REYDON, 2 KM

FK0637'(1.25 MI) SOUTH OF THE WASHITA RIVER, 2 KM (1.25 MI) EAST OF THE

FK0637'OKLAHOMA-TEXAS STATE LINE, ALONG A PAVED ROAD, AT THE NORTH EDGE OF

A

FK0637'CULTIVATED FIELD, ON THE RIGHT-OF-WAY (FENCE IS IN THE WRONG PLACE),

FK0637'IN THE NORTHEAST 1/4 OF SECTION 32, T 15 N, R 26 W.

FK0637'OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.

FK0637'TO REACH FROM THE CROSSROAD AT THE JUNCTION OF STATE HIGHWAYS 30

AND

FK0637'47 ON THE WEST SIDE OF REYDON, GO NORTH ON HIGHWAY 30 FOR 9.97 KM

FK0637'(6.20 MI) TO A CROSSROAD. TURN LEFT, WEST, ON PAVED ROAD (EW 88) FOR

FK0637'4.90 KM (3.05 MI) TO A DIRT CROSSROAD AT FRAME HOUSE ON THE RIGHT.

FK0637'CONTINUE AHEAD FOR 0.17 KM (0.10 MI) TO THE STATION ON THE LEFT ON

FK0637'TOP OF A VERY SLIGHT RISE.

FK0637'STATION MARK IS SET IN THE TOP OF A 20-CM SQUARE CONCRETE POST

FK0637'PROJECTING 10 CM ABOVE GROUND. IT IS 8.8 M (28.9 FT) SOUTH OF, AND 1

FK0637'M (3.3 FT) HIGHER THAN THE ROAD CENTER, 0.8 M (2.6 FT) SOUTH OF A

FK0637'WIRE FENCE, 1.0 M (3.3 FT) WEST OF A METAL WITNESS POST, AND 0.5 M

FK0637'(1.6 FT) EAST OF A FIBERGLASS WITNESS POST.

FK0637



FK0637 STATION RECOVERY (1999)  
FK0637  
FK0637 RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (CSM)  
FK0637 THE STATION IS LOCATED ABOUT 11 KM (6.85 MI) NORTHWEST OF REYDON, 2 KM  
FK0637 (1.25 MI) SOUTH OF THE WASHITA RIVER, 2 KM (1.25 MI) EAST OF THE  
FK0637 OKLAHOMA-TEXAS STATE LINE, ALONG A PAVED ROAD, AT THE NORTH EDGE OF  
A  
FK0637 CULTIVATED FIELD, ON THE RIGHT-OF-WAY (FENCE IS IN THE WRONG PLACE),  
FK0637 IN THE NORTHEAST 1/4 OF SECTION 32, T 15 N, R 26 W.  
FK0637 OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION. TO REACH FROM  
THE  
FK0637 CROSSROAD AT THE JUNCTION OF STATE HIGHWAYS 30 AND 47 ON THE WEST  
SIDE  
FK0637 OF REYDON, GO NORTH ON HIGHWAY 30 FOR 9.97 KM (6.20 MI) TO A  
FK0637 CROSSROAD. TURN LEFT, WEST, ON PAVED ROAD (EW 88) FOR 4.90 KM (3.05  
FK0637 MI) TO A DIRT CROSSROAD AT A FRAME HOUSE ON THE RIGHT. CONTINUE AHEAD  
FK0637 FOR 0.17 KM (0.10 MI) TO THE STATION ON THE LEFT, ON TOP OF A VERY  
FK0637 SLIGHT RISE. STATION IS SET IN THE TOP OF A 20 CM SQUARE CONCRETE  
FK0637 POST PROJECTING 10 CM ABOVE GROUND. IT IS 9.63 M (31.59 FT) SOUTH OF,  
FK0637 AND 1.0 M (3.3 FT) HIGHER THAN THE ROAD CENTER, 0.8 M (2.6 FT) SOUTH  
FK0637 OF AN ABANDONED WIRE FENCE, 0.98 M (3.22 FT) EAST-NORTHEAST OF AN  
FK0637 OKDOT METAL WITNESS POST, 0.91 M (2.99 FT) WEST OF AN OKDOT METAL  
FK0637 WITNESS POST, 0.88 M (2.89 FT) SOUTH OF AN OKDOT METAL WITNESS POST  
FK0637 AND 0.55 M (1.80 FT) EAST OF A FIBERGLASS WITNESS POST.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0638 \*\*\*\*\*

FK0638 CBN - This is a Cooperative Base Network Control Station.

**FK0638 DESIGNATION - ANTHON RESET**

FK0638 PID - FK0638

FK0638 STATE/COUNTY- OK/CUSTER

FK0638 USGS QUAD - PUTNAM (1985)

FK0638

FK0638 \*CURRENT SURVEY CONTROL

FK0638

FK0638\* NAD 83(2007)- 35 45 15.13907(N) 098 58 40.68140(W) ADJUSTED

FK0638\* NAVD 88 - 586.4 (meters) 1924. (feet) GPS OBS

FK0638

FK0638 EPOCH DATE - 2002.00

FK0638 X - -808,743.081 (meters) COMP

FK0638 Y - -5,118,942.324 (meters) COMP

FK0638 Z - 3,706,419.909 (meters) COMP

FK0638 LAPLACE CORR- 2.92 (seconds) DEFLEC09

FK0638 ELLIP HEIGHT- 558.825 (meters) (02/10/07) ADJUSTED

FK0638 GEOID HEIGHT- -27.58 (meters) GEOID09

FK0638

FK0638 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FK0638 Type PID Designation North East Ellip

FK0638 -----

FK0638 NETWORK FK0638 ANTHON RESET 1.16 0.88 2.23

FK0638 -----

FK0638

FK0638.The horizontal coordinates were established by GPS observations

FK0638.and adjusted by the National Geodetic Survey in February 2007.

FK0638

FK0638.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FK0638.See [National Readjustment](#) for more information.

FK0638.The horizontal coordinates are valid at the epoch date displayed above.

FK0638.The epoch date for horizontal control is a decimal equivalence

FK0638.of Year/Month/Day.

FK0638

FK0638.The orthometric height was determined by GPS observations and a

FK0638.high-resolution geoid model.

FK0638

FK0638.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0638

FK0638.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0638

FK0638.The ellipsoidal height was determined by GPS observations

FK0638.and is referenced to NAD 83.

FK0638

FK0638.The geoid height was determined by GEOID09.

FK0638

FK0638; North East Units Scale Factor Converg.

FK0638;SPC OK N - 84,126.585 511,554.111 MT 0.99997126 -0 34 37.7

FK0638;SPC OK N - 276,005.30 1,678,323.78 sFT 0.99997126 -0 34 37.7

FK0638:UTM 14 - 3,956,687.011 501,991.921 MT 0.99960005 +0 00 46.3

FK0638

FK0638! - Elev Factor x Scale Factor = Combined Factor

FK0638!SPC OK N - 0.99991230 x 0.99997126 = 0.99988356

FK0638!UTM 14 - 0.99991230 x 0.99960005 = 0.99951238

FK0638

FK0638: Primary Azimuth Mark Grid Az

FK0638:SPC OK N - ANTHON AZ MK 2 045 30 39.9

FK0638:UTM 14 - ANTHON AZ MK 2 044 55 15.9

FK0638

FK0638|-----|

FK0638|PID Reference Object Distance Geod. Az |

FK0638| dddmmss.s |

FK0638|FK0257 ANTHON AZ 0445522.4 |

FK0638|CK8812 ANTHON AZ MK 2 0445602.2 |

FK0638|CK8813 ANTHON RM 1 26.655 METERS 04510 |

FK0638|FK0553 THOMAS MUNICIPAL WATER TANK APPROX.20.7 KM 0903800.7 |

FK0638|FK0560 CUSTER MUNICIPAL WATER TANK APPROX.12.6 KM 1403021.6 |

FK0638|CK8815 ANTHON RM 3 14.750 METERS 26334 |

FK0638|CK8814 ANTHON RM 2 42.538 METERS 26600 |

FK0638|CK8816 ANTHON RM 4 18.312 METERS 35744 |

FK0638|-----|

FK0638

FK0638 SUPERSEDED SURVEY CONTROL

FK0638

FK0638 ELLIP H (04/16/01) 558.815 (m) GP( ) 4 2

FK0638 NAD 83(1993)- 35 45 15.13892(N) 098 58 40.68075(W) AD( ) B

FK0638 ELLIP H (05/09/94) 558.851 (m) GP( ) 4 2

FK0638 NAD 83(1986)- 35 45 15.14150(N) 098 58 40.66508(W) AD( ) 1

FK0638 NAD 27 - 35 45 14.97148(N) 098 58 39.33091(W) AD( ) 1

FK0638

FK0638.Superseded values are not recommended for survey control.

FK0638.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0638.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0638

FK0638\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE0199156687(NAD 83)

FK0638\_MARKER: DH = HORIZONTAL CONTROL DISK

FK0638\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0638\_SP\_SET: CONCRETE POST

FK0638\_STAMPING: ANTHON 1935 1976

FK0638\_MARK LOGO: CGS

FK0638\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0638\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0638+STABILITY: SURFACE MOTION

FK0638\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0638+SATELLITE: SATELLITE OBSERVATIONS - May 17, 1993

FK0638

FK0638 HISTORY - Date Condition Report By

FK0638 HISTORY - 1976 MONUMENTED NGS

FK0638 HISTORY - 19930517 GOOD NGS

FK0638

FK0638 STATION DESCRIPTION

FK0638

FK0638'DESCRIBED BY NATIONAL GEODETIC SURVEY 1976 (CLN)

FK0638'THE STATION SURFACE MARK, REFERENCE MARKS 1 AND 2, AND THE AZIMUTH

FK0638'MARK WERE FOUND TO HAVE BEEN DESTROYED. THE STATION SUB-SURFACE

FK0638'MARK WAS RECOVERED AND FOUND IN GOOD CONDITION.

FK0638'

FK0638'THE STATION SURFACE MARK, REFERENCE MARKS 3 AND 4, AND THE AZIMUTH  
FK0638'MARK WERE RE-ESTABLISHED AT THIS TIME.

FK0638'

FK0638'A NEW AND COMPLETE DESCRIPTION FOLLOWS--

FK0638'

FK0638'THE STATION IS LOCATED ABOUT 13 MILES WEST OF THOMAS, 8 MILES  
FK0638'NORTHWEST OF CUSTER, 7 MILES SOUTH OF PUTMAN, 1/2 MILE WEST OF THE  
FK0638'INTERSECTION OF U. S. HIGHWAY 183 AND STATE HIGHWAY 47, AND ON THE  
FK0638'SOUTH RIGHT-OF-WAY OF A GRAVEL ROAD.

FK0638'

FK0638'TO REACH THE STATION FROM PUTMAN, GO SOUTH ON U. S. HIGHWAY 183 FOR 7  
FK0638'MILES TO THE AZIMUTH MARK ON THE RIGHT. CONTINUE SOUTH ON U. S.  
FK0638'HIGHWAY 183 FOR 0.5 MILE TO THE INTERSECTION OF STATE HIGHWAY 47 ON  
FK0638'THE LEFT AND A GRAVEL ROAD ON THE RIGHT. TURN RIGHT AND GO WEST  
FK0638'ON GRAVEL ROAD FOR 0.5 MILE TO STATION ON THE LEFT.

FK0638'

FK0638'STATION MARK IS A STANDARD DISK, SET IN THE TOP OF A SQUARE CONCRETE  
FK0638'POST, THAT IS FLUSH WITH THE GROUND AND THE DISK IS STAMPED ANTHON  
FK0638'1935 1976. IT IS 61 FEET SOUTH OF A TELEPHONE POLE, 32 FEET SOUTH  
FK0638'OF THE CENTER OF GRAVEL ROAD, 27 FEET WEST OF A HI-LINE POLE, 5 FEET  
FK0638'NORTH OF A FENCE-CORNER AND METAL WITNESS POST.

FK0638'

FK0638'REFERENCE MARK NO. 3 IS A STANDARD DISK, SET IN THE TOP OF A SQUARE  
FK0638'CONCRETE POST, THAT PROJECTS ABOUT 6-INCHES AND IS STAMPED ANTHON  
FK0638'1935 NO 3 1976. IT IS 49 FEET WEST OF A FENCE-CORNER, 36 FEET SOUTH  
FK0638'OF THE CENTER OF GRAVEL ROAD, 1-FOOT NORTH OF THE FENCE-LINE AND  
FK0638'1-FOOT EAST OF A METAL WITNESS POST.

FK0638'

FK0638'REFERENCE MARK NO. 4 IS A STANDARD DISK, SET IN THE TOP OF A ROUND  
FK0638'CONCRETE POST, THAT PROJECTS ABOUT 6-INCHES AND IS STAMPED ANTHON  
FK0638'1935 NO 4 1976. IT IS 65 FEET NORTH OF A FENCE-CORNER, 30 FEET  
FK0638'NORTH OF THE CENTER OF A GRAVEL ROAD AND 1.6 FEET SOUTH OF A  
FK0638'TELEPHONE POLE.

FK0638'

FK0638'AZIMUTH MARK IS A STANDARD DISK, SET IN THE TOP OF A SQUARE CONCRETE  
FK0638'POST, THAT IS FLUSH WITH THE GROUND AND IS STAMPED ANTHON 1935 1976.  
FK0638'IT IS 100 FEET SOUTH OF A T FENCE-CORNER, 96 FEET SOUTH OF A  
FK0638'HI-LINE POLE, 48 FEET WEST OF THE CENTER-LINE OF HIGHWAY, 7 FEET  
FK0638'EAST OF THE FENCE-LINE AND 6 FEET EAST OF A METAL WITNESS POST.

FK0638'

FK0638'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--PUTMAN 7-MILES  
FK0638'SOUTH.

FK0638

FK0638 STATION RECOVERY (1993)

FK0638

FK0638'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993

FK0638'STATION MARK WAS APPARENTLY RESET BY OKDT IN THE 1980S AFTER IT HAD  
FK0638'BEEN RESET BY NGS.

FK0638'STATION IS LOCATED ABOUT 8 KM (4.95 MI) NORTHWEST OF CUSTER CITY, 11  
FK0638'KM (6.85 MI) SOUTH OF PUTNAM, 0.8 KM (0.50 MI) WEST OF THE JUNCTION  
FK0638'OF US HIGHWAY 183 AND STATE HIGHWAY 47 EAST, ALONG A GRAVEL SECTION  
FK0638'ROAD, ON THE RIGHT-OF-WAY, ON TOP OF A RISE, AT A HALF-SECTION  
FK0638'FENCELINE, IN NORTH CENTRAL SECTION 26, T 15 N, R 17 W.

FK0638'OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.

FK0638 TO REACH FROM THE JUNCTION OF US HIGHWAY 183 AND STATE HIGHWAY 47  
FK0638 EAST, GO WEST ON THE GRAVEL ROAD FOR 0.81 KM (0.50 MI) TO THE STATION  
FK0638 ON THE LEFT AT HIGH GROUND.

FK0638 STATION MARK IS SET IN THE TOP OF A 30-CM ROUND CONCRETE POST FLUSH  
FK0638 WITH THE GROUND. IT IS 8.1 M (26.6 FT) SOUTH OF, AND SLIGHTLY LOWER  
FK0638 THAN THE ROAD CENTER, 0.3 M (1.0 FT) SOUTH OF A METAL WITNESS POST,  
FK0638 1.8 M (5.9 FT) NORTH OF A T-FENCE CORNER, 0.5 M (1.6 FT) EAST OF A  
FK0638 FIBERGLASS WITNESS POST, AND 7.9 M (25.9 FT) WEST-NORTHWEST OF A  
FK0638 UTILITY POLE.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EM1086 \*\*\*\*\*

EM1086 CBN - This is a Cooperative Base Network Control Station.

**EM1086 DESIGNATION - BETHEL**

EM1086 PID - EM1086

EM1086 STATE/COUNTY- OK/COMANCHE

EM1086 USGS QUAD - LETITIA (1991)

EM1086

EM1086 \*CURRENT SURVEY CONTROL

EM1086

EM1086\* NAD 83(2007)- 34 35 37.79470(N) 098 08 57.27809(W) ADJUSTED

EM1086\* NAVD 88 - 350.1 (meters) 1149. (feet) GPS OBS

EM1086

EM1086 EPOCH DATE - 2002.00

EM1086 X - -745,106.666 (meters) COMP

EM1086 Y - -5,203,329.316 (meters) COMP

EM1086 Z - 3,601,049.519 (meters) COMP

EM1086 LAPLACE CORR- -1.65 (seconds) DEFLEC09

EM1086 ELLIP HEIGHT- 324.248 (meters) (02/10/07) ADJUSTED

EM1086 GEOID HEIGHT- -25.82 (meters) GEOID09

EM1086

EM1086 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EM1086 Type PID Designation North East Ellip

EM1086 -----

EM1086 NETWORK EM1086 BETHEL 1.76 1.57 4.43

EM1086 -----

EM1086

EM1086.The horizontal coordinates were established by GPS observations

EM1086.and adjusted by the National Geodetic Survey in February 2007.

EM1086

EM1086.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EM1086.See [National Readjustment](#) for more information.

EM1086.The horizontal coordinates are valid at the epoch date displayed above.

EM1086.The epoch date for horizontal control is a decimal equivalence

EM1086.of Year/Month/Day.

EM1086

EM1086.The orthometric height was determined by GPS observations and a

EM1086.high-resolution geoid model.

EM1086

EM1086.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EM1086

EM1086.The Laplace correction was computed from DEFLEC09 derived deflections.

EM1086

EM1086.The ellipsoidal height was determined by GPS observations

EM1086.and is referenced to NAD 83.

EM1086

EM1086.The geoid height was determined by GEOID09.

EM1086

EM1086; North East Units Scale Factor Converg.

EM1086;SPC OK S - 139,828.791 586,309.699 MT 0.99993596 -0 05 05.0

EM1086;SPC OK S - 458,754.96 1,923,584.40 sFT 0.99993596 -0 05 05.0

EM1086;UTM 14 - 3,828,330.931 578,015.585 MT 0.99967502 +0 28 59.0

EM1086

EM1086! - Elev Factor x Scale Factor = Combined Factor

EM1086!SPC OK S - 0.99994910 x 0.99993596 = 0.99988507

EM1086!UTM 14 - 0.99994910 x 0.99967502 = 0.99962414

EM1086

EM1086 SUPERSEDED SURVEY CONTROL

EM1086

EM1086 ELLIP H (04/16/01) 324.268 (m) GP( ) 4 2

EM1086 NAD 83(1993)- 34 35 37.79454(N) 098 08 57.27818(W) AD( ) B

EM1086 ELLIP H (05/09/94) 324.316 (m) GP( ) 4 2

EM1086

EM1086.Superseded values are not recommended for survey control.

EM1086.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EM1086.[See file dsdata.txt](#) to determine how the superseded data were derived.

EM1086

EM1086\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SND7801528330(NAD 83)

EM1086\_MARKER: I = METAL ROD

EM1086\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

EM1086\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

EM1086\_STAMPING: BETHEL 1993

EM1086\_MARK LOGO: NGS

EM1086\_PROJECTION: RECESSED 1 CENTIMETERS

EM1086\_MAGNETIC: I = MARKER IS A STEEL ROD

EM1086\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

EM1086\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EM1086+SATELLITE: SATELLITE OBSERVATIONS - July 23, 2009

EM1086\_ROD/PIPE-DEPTH: 5.94 meters

EM1086\_SLEEVE-DEPTH : 0.9 meters

EM1086

EM1086 HISTORY	- Date	Condition	Report By
EM1086 HISTORY	- 1993	MONUMENTED	NGS
EM1086 HISTORY	- 20000218	GOOD	LOCSUR
EM1086 HISTORY	- 20090423	GOOD	INDIV
EM1086 HISTORY	- 20090723	GOOD	INDIV

EM1086

EM1086 STATION DESCRIPTION

EM1086

EM1086'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

EM1086'STATION IS LOCATED ABOUT 23 KM (14.30 MI) EAST OF LAWTON, 20 KM

EM1086'(12.40 MI) NORTHWEST OF DUNCAN, 0.67 KM (0.40 MI) WEST OF THE

EM1086'COMANCHE-STEPHENS COUNTY LINE, ALONG STATE HIGHWAY 7, ON THE

EM1086'RIGHT-OF-WAY, ON TOP OF A RISE, AT A FIELD ENTRANCE, ACROSS THE

EM1086'HIGHWAY FROM A WHITE FRAME HOUSE, IN THE NORTHEAST 1/4 OF SECTION 4,

EM1086'T 1 N, R 9 W. OWNERSHIP--STATE DEPARTMENT OF TRANSPORTATION.

EM1086'TO REACH FROM THE UNDERPASS AT THE JUNCTION OF INTERSTATE HIGHWAY

44

EM1086'AND STATE HIGHWAY 7 (EXIT 36A) ON THE SOUTHEAST SIDE OF LAWTON, GO

EM1086'EAST ON HIGHWAY 7 FOR 15.31 KM (9.50 MI) TO THE JUNCTION OF STATE

EM1086'HIGHWAY 65. CONTINUE AHEAD FOR 4.87 KM (3.00 MI) TO A CROSSROAD AT

EM1086'THE BETHEL UNITED METHODIST CHURCH ON THE RIGHT. CONTINUE AHEAD

FOR

EM1086'0.95 KM (0.60 MI) TO TOP OF RISE AND STATION ON THE RIGHT.

EM1086'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STEEL ROD ENCASED IN A

EM1086'PVC PIPE WITH LOGO CAP SET IN A CONCRETE POST 1 CM BELOW GROUND. IT

EM1086'IS 28.7 M (94.2 FT) SOUTH OF, AND ABOUT LEVEL WITH THE HIGHWAY

EM1086 CENTER, 0.8 M (2.6 FT) NORTH OF THE RIGHT-OF-WAY FENCE, 0.7 M  
EM1086 (2.3 FT) NORTH OF A METAL WITNESS POST, 1.1 M (3.6 FT) EAST OF A  
EM1086 METAL WITNESS POST, 1.1 M (3.6 FT) WEST OF A METAL WITNESS POST, 7.6  
EM1086 M (24.9 FT) EAST OF THE CENTER OF FIELD ENTRANCE WITH PIPE GATE, AND  
EM1086 4.5 M (14.8 FT) WEST OF THE EXTENDED CENTER OF DRIVEWAY LEADING TO  
EM1086 THE HOUSE.

EM1086 DESCRIBED BY D.G. AUG

EM1086

EM1086 STATION RECOVERY (2000)

EM1086

EM1086 RECOVERY NOTE BY LOCAL SURVEYOR (INDIVIDUAL OR FIRM) 2000 (DP)

EM1086 RECOVERED IN GOOD CONDITION. NOTE--USED IN LAWTON 2000  
MONUMENTATION

EM1086 PROGRAM BY THE CITY OF LAWTON. CONSIDERED A GOOD GPS OCCUPATION  
EM1086 POINT, NOT OBSTRUCTIONS.

EM1086

EM1086 STATION RECOVERY (2009)

EM1086

EM1086 RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2009 (DP)

EM1086 RECOVERED IN GOOD CONDITION.

EM1086

EM1086 STATION RECOVERY (2009)

EM1086

EM1086 RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2009 (DP)

EM1086 RECOVERED IN GOOD CONDITION.

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The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0640 \*\*\*\*\*

FK0640 CBN - This is a Cooperative Base Network Control Station.

**FK0640 DESIGNATION - COWDEN**

FK0640 PID - FK0640

FK0640 STATE/COUNTY- OK/WASHITA

FK0640 USGS QUAD - COLONY (1984)

FK0640

FK0640 \*CURRENT SURVEY CONTROL

FK0640

FK0640\* NAD 83(2007)- 35 17 25.90677(N) 098 42 44.04858(W) ADJUSTED

FK0640\* NAVD 88 - 487.7 (meters) 1600. (feet) GPS OBS

FK0640

FK0640 EPOCH DATE - 2002.00

FK0640 X - -789,509.255 (meters) COMP

FK0640 Y - -5,152,107.314 (meters) COMP

FK0640 Z - 3,664,489.372 (meters) COMP

FK0640 LAPLACE CORR- -1.52 (seconds) DEFLEC09

FK0640 ELLIP HEIGHT- 460.936 (meters) (02/10/07) ADJUSTED

FK0640 GEOID HEIGHT- -26.81 (meters) GEOID09

FK0640

FK0640 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FK0640 Type PID Designation North East Ellip

FK0640 -----

FK0640 NETWORK FK0640 COWDEN 1.31 1.12 3.19

FK0640 -----

FK0640

FK0640.The horizontal coordinates were established by GPS observations

FK0640.and adjusted by the National Geodetic Survey in February 2007.

FK0640

FK0640.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FK0640.See [National Readjustment](#) for more information.

FK0640.The horizontal coordinates are valid at the epoch date displayed above.

FK0640.The epoch date for horizontal control is a decimal equivalence

FK0640.of Year/Month/Day.

FK0640

FK0640.The orthometric height was determined by GPS observations and a

FK0640.high-resolution geoid model.

FK0640

FK0640.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0640

FK0640.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0640

FK0640.The ellipsoidal height was determined by GPS observations

FK0640.and is referenced to NAD 83.

FK0640

FK0640.The geoid height was determined by GEOID09.

FK0640

FK0640; North East Units Scale Factor Converg.

FK0640;SPC OK S - 217,335.592 535,211.727 MT 1.00001180 -0 24 15.4

FK0640;SPC OK S - 713,041.85 1,755,940.47 sFT 1.00001180 -0 24 15.4

FK0640;UTM 14 - 3,905,300.434 526,165.852 MT 0.99960844 +0 09 58.5

FK0640

FK0640! - Elev Factor x Scale Factor = Combined Factor

FK0640!SPC OK S - 0.99992766 x 1.00001180 = 0.99993945

FK0640!UTM 14 - 0.99992766 x 0.99960844 = 0.99953612

FK0640

FK0640 SUPERSEDED SURVEY CONTROL

FK0640

FK0640 ELLIP H (04/16/01) 460.943 (m) GP( ) 4 2

FK0640 NAD 83(1993)- 35 17 25.90670(N) 098 42 44.04830(W) AD( ) B

FK0640 ELLIP H (05/09/94) 460.980 (m) GP( ) 4 2

FK0640

FK0640.Superseded values are not recommended for survey control.

FK0640.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0640.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0640

FK0640\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE2616505300(NAD 83)

FK0640\_MARKER: I = METAL ROD

FK0640\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

FK0640\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

FK0640\_STAMPING: COWDEN 1993

FK0640\_MARK LOGO: NGS

FK0640\_PROJECTION: RECESSED 1 CENTIMETERS

FK0640\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0640\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

FK0640\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0640+SATELLITE: SATELLITE OBSERVATIONS - 1993

FK0640\_ROD/PIPE-DEPTH: 3.7 meters

FK0640

FK0640 HISTORY - Date Condition Report By

FK0640 HISTORY - 1993 MONUMENTED NGS

FK0640

FK0640 STATION DESCRIPTION

FK0640

FK0640'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

FK0640'STATION IS LOCATED ABOUT 21.5 KM (13.35 MI) EAST OF CORDELL, 8 KM

FK0640'(4.95 MI) WEST OF THE WASHITA-CADDO COUNTY LINE, AT COWDEN JUNCTION,

FK0640'IN THE SOUTHWEST ANGLE OF THE JUNCTION OF STATE HIGHWAYS 115 AND 152,

FK0640'ACROSS THE HIGHWAY FROM A STATE MAINTAINANCE YARD, ALONG THE

FK0640'NORTHWEST-SOUTHEAST RIGHT-OF-WAY FENCE, IN THE NORTHEAST CORNER OF

FK0640'SECTION 6, T 9 N, R 14 W. OWNERSHIP--OKLAHOMA DEPARTMENT OF

FK0640'TRANSPORTATION.

FK0640'TO REACH FROM THE JUNCTION OF HIGHWAYS 115 AND 152, GO WEST ON  
HIGHWAY

FK0640'152 FOR 44 M (144.4 FT) TO THE STATION ON THE LEFT.

FK0640'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN A

FK0640'2.5 CM GREASE FILLED SLEEVE ENCASED IN A 12.7 CM PVC PIPE WITH LOGO

FK0640'CAP SURROUNDED BY CONCRETE SET 1 CM BELOW GROUND. IT IS 36.7 M

FK0640'(120.4 FT) SOUTH FROM, AND 1 M (3.3 FT) HIGHER THAN THE CENTER OF

FK0640'HIGHWAY 152, 43.8 M (143.7 FT) WEST FROM THE SOUTH END OF A PAVED

FK0640'TRAFFIC ISLAND IN THE MIDDLE OF HIGHWAY 115, 25.6 M (84.0 FT)

FK0640'NORTHWEST FROM A FENCE CORNER AT A POWERLINE POLE, 30.2 M (99.1 FT)

FK0640'SOUTHEAST FROM A FENCE CORNER POST, 0.8 M (2.6 FT) NORTHEAST FROM A

FK0640'FIBERGLASS WITNESS POST IN THE PASTURE FENCE, 1.0 M (3.3 FT)

FK0640'SOUTHWEST OF A STEEL WITNESS POST, 1.2 M (3.9 FT) NORTHWEST OF A STEEL

FK0640'WITNESS POST, AND 1.1 M (3.6 FT) SOUTHEAST OF A STEEL WITNESS POST.

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL1051 \*\*\*\*\*

EL1051 CBN - This is a Cooperative Base Network Control Station.

**EL1051 DESIGNATION - FUQUA**

EL1051 PID - EL1051

EL1051 STATE/COUNTY- OK/STEPHENS

EL1051 USGS QUAD - LAKE FUQUA (1974)

EL1051

EL1051 \*CURRENT SURVEY CONTROL

EL1051

EL1051\* NAD 83(2007)- 34 36 57.90498(N) 097 40 07.12357(W) ADJUSTED

EL1051\* NAVD 88 - 338.6 (meters) 1111. (feet) GPS OBS

EL1051

EL1051 EPOCH DATE - 2002.00

EL1051 X - -701,246.963 (meters) COMP

EL1051 Y - -5,207,997.402 (meters) COMP

EL1051 Z - 3,603,075.015 (meters) COMP

EL1051 LAPLACE CORR- 1.98 (seconds) DEFLEC09

EL1051 ELLIP HEIGHT- 312.862 (meters) (02/10/07) ADJUSTED

EL1051 GEOID HEIGHT- -25.74 (meters) GEOID09

EL1051

EL1051 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL1051 Type PID Designation North East Ellip

EL1051 -----

EL1051 NETWORK EL1051 FUQUA 1.25 1.12 3.02

EL1051 -----

EL1051

EL1051.The horizontal coordinates were established by GPS observations

EL1051.and adjusted by the National Geodetic Survey in February 2007.

EL1051

EL1051.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL1051.See [National Readjustment](#) for more information.

EL1051.The horizontal coordinates are valid at the epoch date displayed above.

EL1051.The epoch date for horizontal control is a decimal equivalence

EL1051.of Year/Month/Day.

EL1051

EL1051.The orthometric height was determined by GPS observations and a

EL1051.high-resolution geoid model.

EL1051

EL1051.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL1051

EL1051.The Laplace correction was computed from DEFLEC09 derived deflections.

EL1051

EL1051.The ellipsoidal height was determined by GPS observations

EL1051.and is referenced to NAD 83.

EL1051

EL1051.The geoid height was determined by GEOID09.

EL1051

EL1051; North East Units Scale Factor Converg.

EL1051;SPC OK S - 142,336.972 630,387.356 MT 0.99993610 +0 11 17.1

EL1051;SPC OK S - 466,983.88 2,068,195.85 sFT 0.99993610 +0 11 17.1

EL1051;UTM 14 - 3,831,275.333 622,056.930 MT 0.99978363 +0 45 23.0

EL1051

EL1051! - Elev Factor x Scale Factor = Combined Factor

EL1051!SPC OK S - 0.99995089 x 0.99993610 = 0.99988699

EL1051!UTM 14 - 0.99995089 x 0.99978363 = 0.99973453

EL1051

EL1051 SUPERSEDED SURVEY CONTROL

EL1051

EL1051 ELLIP H (04/16/01) 312.873 (m) GP( ) 4 2

EL1051 NAD 83(1993)- 34 36 57.90453(N) 097 40 07.12357(W) AD( ) B

EL1051 ELLIP H (05/09/94) 312.923 (m) GP( ) 4 2

EL1051

EL1051.Superseded values are not recommended for survey control.

EL1051.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL1051.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL1051

EL1051\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPD2205631275(NAD 83)

EL1051\_MARKER: I = METAL ROD

EL1051\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

EL1051\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

EL1051\_STAMPING: FUQUA 1993

EL1051\_MARK LOGO: NGS

EL1051\_PROJECTION: FLUSH

EL1051\_MAGNETIC: N = NO MAGNETIC MATERIAL

EL1051\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

EL1051\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL1051+SATELLITE: SATELLITE OBSERVATIONS - February 03, 2004

EL1051\_ROD/PIPE-DEPTH: 2.3 meters

EL1051\_SLEEVE-DEPTH : 00.9 meters

EL1051

EL1051 HISTORY - Date Condition Report By

EL1051 HISTORY - 1993 MONUMENTED NGS

EL1051 HISTORY - 20040203 GOOD OKSLS

EL1051

EL1051 STATION DESCRIPTION

EL1051

EL1051'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

EL1051'STATION IS LOCATED ABOUT 27 KM (16.75 MI) EAST OF MARLOW, 26 KM

EL1051'(16.15 MI) WEST OF ELMORE CITY, 2.5 KM (1.55 MI) SOUTH OF STATE

EL1051'HIGHWAY 29, ON THE EAST SIDE OF THE NORTHEAST FINGER OF LAKE FUQUA,

EL1051'ALONG A PAVED ROAD, ON A BENCH LEADING WEST DOWNSLOPE TO THE LAKE, IN

EL1051'A FIELD, IN EAST CENTRAL SECTION 25, T 2 N, R 5 W. OWNERSHIP--CITY

EL1051'OF DUNCAN.

EL1051'TO REACH FROM THE JUNCTION OF US HIGHWAY 81 AND STATE HIGHWAY 29 IN

EL1051'MARLOW, GO EAST ON HIGHWAY 29 FOR 10.5 KM (6.50 MI) TO A BRIDGE OVER

EL1051'CLEAR CREEK. CONTINUE AHEAD, EAST, 13.2 KM (8.20 MI) TO A BRIDGE

EL1051'OVER A CREEK. CONTINUE AHEAD, EAST, 3.5 KM (2.15 MI) TO A PAVED ROAD

EL1051'RIGHT AT SIGN -LAKE FUQUA-. TURN RIGHT, SOUTH, ON PAVED ROAD FOR 2.05

EL1051'KM (1.25 MI) TO THE SOUTH END OF A CAUSEWAY ACROSS THE LAKE. CONTINUE

EL1051'AHEAD FOR 0.44 KM (0.25 MI) TO THE STATION ON THE RIGHT, JUST BEFORE

EL1051'A TRACK ROAD LEFT.

EL1051'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN A

EL1051'GREASE FILLED SLEEVE 90 CM LONG ENCASED IN A 12.7 CM PVC PIPE WITH

EL1051'LOGO CAP SURROUNDED BY CONCRETE FLUSH WITH THE GROUND. IT IS 11.7 M

EL1051'(38.4 FT) WEST OF, AND LEVEL WITH THE ROAD CENTER, 2.5 M (8.2 FT)

EL1051 WEST OF A METAL WITNESS POST IN THE FENCE LINE, 1.0 M (3.3 FT) NORTH  
EL1051 OF A FIBERGLASS WITNESS POST, 1.1 M (3.6 FT) SOUTH OF A FIBERGLASS  
EL1051 WITNESS POST, 3.0 M (9.8 FT) NORTHWEST OF THE NORTH ONE OF TWO BRACED  
EL1051 RAILROAD TIE FENCE POSTS, AND 11.5 M (37.7 FT) NORTH OF THE EXTENDED  
EL1051 CENTER OF THE TRACK ROAD.

EL1051

EL1051 STATION RECOVERY (2004)

EL1051

EL1051 RECOVERY NOTE BY OKLAHOMA SOCIETY OF LAND SURVEYORS 2004 (DP)

EL1051 OPUS-4HOUR SESSION RETURNED

EL1051 ZONE 3502-OKAHOMA SOUTH

EL1051 142336.969 NORTHING 630387.354 EASTING

EL1051 ELLIPS 312.858

EL1051 ALL NAD-83 (CORS96) EPOCH 2002.00

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0644 \*\*\*\*\*

FK0644 CBN - This is a Cooperative Base Network Control Station.

**FK0644 DESIGNATION - R 65 11**

FK0644 PID - FK0644

FK0644 STATE/COUNTY- OK/ROGER MILLS

FK0644 USGS QUAD - HAMMON (1987)

FK0644

FK0644 \*CURRENT SURVEY CONTROL

FK0644

FK0644\* NAD 83(2007)- 35 40 18.57657(N) 099 27 52.95677(W) ADJUSTED

FK0644\* NAVD 88 - 586.0 (meters) 1923. (feet) GPS OBS

FK0644

FK0644 EPOCH DATE - 2002.00

FK0644 X - -853,077.503 (meters) COMP

FK0644 Y - -5,117,149.808 (meters) COMP

FK0644 Z - 3,698,997.436 (meters) COMP

FK0644 LAPLACE CORR- 0.44 (seconds) DEFLEC09

FK0644 ELLIP HEIGHT- 558.087 (meters) (02/10/07) ADJUSTED

FK0644 GEOID HEIGHT- -27.91 (meters) GEOID09

FK0644

FK0644 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FK0644 Type PID Designation North East Ellip

FK0644 -----

FK0644 NETWORK FK0644 R 65 11 1.82 1.59 4.23

FK0644 -----

FK0644

FK0644.The horizontal coordinates were established by GPS observations

FK0644.and adjusted by the National Geodetic Survey in February 2007.

FK0644

FK0644.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FK0644.See [National Readjustment](#) for more information.

FK0644.The horizontal coordinates are valid at the epoch date displayed above.

FK0644.The epoch date for horizontal control is a decimal equivalence

FK0644.of Year/Month/Day.

FK0644

FK0644.The orthometric height was determined by GPS observations and a

FK0644.high-resolution geoid model.

FK0644

FK0644.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0644

FK0644.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0644

FK0644.The ellipsoidal height was determined by GPS observations

FK0644.and is referenced to NAD 83.

FK0644

FK0644.The geoid height was determined by GEOID09.

FK0644

FK0644; North East Units Scale Factor Converg.

FK0644;SPC OK N - 75,541.403 467,398.682 MT 0.99998258 -0 51 51.8

FK0644;SPC OK N - 247,838.75 1,533,457.18 sFT 0.99998258 -0 51 51.8

FK0644;UTM 14 - 3,947,649.706 457,943.786 MT 0.99962179 -0 16 15.6

FK0644

FK0644! - Elev Factor x Scale Factor = Combined Factor

FK0644!SPC OK N - 0.99991241 x 0.99998258 = 0.99989499

FK0644!UTM 14 - 0.99991241 x 0.99962179 = 0.99953424

FK0644

FK0644 SUPERSEDED SURVEY CONTROL

FK0644

FK0644 ELLIP H (04/16/01) 558.087 (m) GP( ) 4 2

FK0644 NAD 83(1993)- 35 40 18.57643(N) 099 27 52.95626(W) AD( ) B

FK0644 ELLIP H (05/09/94) 558.114 (m) GP( ) 4 2

FK0644

FK0644.Superseded values are not recommended for survey control.

FK0644.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0644.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0644

FK0644\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME5794347649(NAD 83)

FK0644\_MARKER: DD = SURVEY DISK

FK0644\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0644\_SP\_SET: CONCRETE POST

FK0644\_STAMPING: NO R 65 11 1993

FK0644\_MARK LOGO: OKDOT

FK0644\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0644\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0644+STABILITY: SURFACE MOTION

FK0644\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0644+SATELLITE: SATELLITE OBSERVATIONS - 1993

FK0644

FK0644 HISTORY - Date Condition Report By

FK0644 HISTORY - 1993 MONUMENTED OKDOT

FK0644 HISTORY - 20000118 GOOD NGS

FK0644

FK0644 STATION DESCRIPTION

FK0644

FK0644'DESCRIBED BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 1993

FK0644'STATION IS LOCATED ABOUT 19 KM (11.80 MI) EAST-NORTHEAST OF CHEYENNE,

FK0644'9 KM (5.60 MI) NORTHWEST OF HAMMON, ALONG STATE HIGHWAY 33, ON THE

FK0644'RIGHT-OF-WAY, AT HIGH GROUND, JUST EAST OF A CROSSROAD, ADJACENT TO A

FK0644'PASTURE, IN THE SOUTHWEST 1/4 OF SECTION 20, T 14 N, R 21 W.

FK0644'OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.

FK0644'TO REACH FROM THE JUNCTION OF STATE HIGHWAYS 33 AND 34 ON THE NORTH

FK0644'SIDE OF HAMMON, GO WEST ON HIGHWAY 33 FOR 5.20 KM (3.25 MI) TO A

FK0644'SMALL BRIDGE OVER THE WASHITA RIVER. CONTINUE AHEAD FOR 4.10 KM

FK0644'(2.55 MI) TO HIGH GROUND AND STATION ON THE RIGHT.

FK0644'STATION MARK IS SET IN THE TOP OF A 15-CM CONCRETE POST IN A SLEEVE

FK0644'INSIDE OF A 30-CM ROUND CONCRETE POST 5 CM BELOW GROUND. IT IS 75.6

FK0644'M (248.0 FT) SOUTHEAST OF A FENCE CORNER AT THE CROSSROAD, 20.4 M

FK0644'(66.9 FT) NORTHEAST OF, AND 1 M (3.3 FT) HIGHER THAN THE HIGHWAY

FK0644'CENTER, 0.4 M (1.3 FT) SOUTHWEST OF A CONCRETE RIGHT-OF-WAY POST, 0.7

FK0644'M (2.3 FT) SOUTHEAST OF A METAL WITNESS POST, 1.1 M (3.6 FT)

FK0644'NORTHWEST OF A METAL WITNESS POST, AND 58.0 M (190.3 FT) NORTHWEST OF

FK0644'A T-FENCE CORNER/GATEPOST AT A FIELD ENTRANCE.

FK0644

FK0644 STATION RECOVERY (2000)

FK0644'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2000 (WEH)

FK0644'GOOD.

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EM1091 \*\*\*\*\*

EM1091 CBN - This is a Cooperative Base Network Control Station.

## EM1091 DESIGNATION - TAHOE

EM1091 PID - EM1091

EM1091 STATE/COUNTY- OK/CADDO

EM1091 USGS QUAD - BOONE (1991)

EM1091

EM1091 \*CURRENT SURVEY CONTROL

EM1091

EM1091\* NAD 83(2007)- 34 53 54.95494(N) 098 24 45.37118(W) ADJUSTED

EM1091\* NAVD 88 - 403.1 (meters) 1323. (feet) GPS OBS

EM1091

EM1091 EPOCH DATE - 2002.00

EM1091 X - -766,202.756 (meters) COMP

EM1091 Y - -5,180,828.984 (meters) COMP

EM1091 Z - 3,628,861.775 (meters) COMP

EM1091 LAPLACE CORR- -4.07 (seconds) DEFLEC09

EM1091 ELLIP HEIGHT- 376.786 (meters) (02/10/07) ADJUSTED

EM1091 GEOID HEIGHT- -26.30 (meters) GEOID09

EM1091

EM1091 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EM1091 Type PID Designation North East Ellip

EM1091 -----

EM1091 NETWORK EM1091 TAHOE 1.35 1.27 3.10

EM1091 -----

EM1091

EM1091.The horizontal coordinates were established by GPS observations

EM1091.and adjusted by the National Geodetic Survey in February 2007.

EM1091

EM1091.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EM1091.See [National Readjustment](#) for more information.

EM1091.The horizontal coordinates are valid at the epoch date displayed above.

EM1091.The epoch date for horizontal control is a decimal equivalence

EM1091.of Year/Month/Day.

EM1091

EM1091.The orthometric height was determined by GPS observations and a

EM1091.high-resolution geoid model.

EM1091

EM1091.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EM1091

EM1091.The Laplace correction was computed from DEFLEC09 derived deflections.

EM1091

EM1091.The ellipsoidal height was determined by GPS observations

EM1091.and is referenced to NAD 83.

EM1091

EM1091.The geoid height was determined by GEOID09.

EM1091

EM1091; North East Units Scale Factor Converg.

EM1091;SPC OK S - 173,703.334 562,289.766 MT 0.99995095 -0 14 03.1



EM1091;SPC OK S - 569,891.69 1,844,779.01 sFT 0.99995095 -0 14 03.1  
 EM1091;UTM 14 - 3,861,955.523 553,667.306 MT 0.99963550 +0 20 09.9  
 EM1091

EM1091! - Elev Factor x Scale Factor = Combined Factor  
 EM1091!SPC OK S - 0.99994086 x 0.99995095 = 0.99989181  
 EM1091!UTM 14 - 0.99994086 x 0.99963550 = 0.99957638

EM1091

EM1091 SUPERSEDED SURVEY CONTROL

EM1091

EM1091 ELLIP H (04/16/01) 376.799 (m) GP( ) 4 2  
 EM1091 NAD 83(1993)- 34 53 54.95476(N) 098 24 45.37116(W) AD( ) B  
 EM1091 ELLIP H (05/09/94) 376.840 (m) GP( ) 4 2

EM1091

EM1091.Superseded values are not recommended for survey control.

EM1091.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EM1091.[See file dsdata.txt](#) to determine how the superseded data were derived.

EM1091

EM1091\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SND5366761955(NAD 83)

EM1091\_MARKER: I = METAL ROD

EM1091\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

EM1091\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

EM1091\_STAMPING: TAHOE 1993

EM1091\_MARK LOGO: NGS

EM1091\_PROJECTION: RECESSED 1 CENTIMETERS

EM1091\_MAGNETIC: B = BAR MAGNET IMBEDDED IN MONUMENT

EM1091\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

EM1091\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EM1091+SATELLITE: SATELLITE OBSERVATIONS - 1993

EM1091\_ROD/PIPE-DEPTH: 4.9 meters

EM1091\_SLEEVE-DEPTH : 0.9 meters

EM1091

EM1091 HISTORY	- Date	Condition	Report By
EM1091 HISTORY	- 1993	MONUMENTED	NGS
EM1091 HISTORY	- 20000123	GOOD	LOCSUR

EM1091

EM1091 STATION DESCRIPTION

EM1091

EM1091'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

EM1091'STATION IS LOCATED ABOUT 35 KM (21.75 MI) NORTH OF LAWTON, 4.5 KM

EM1091'(2.80 MI) WEST OF APACHE, ALONG STATE HIGHWAY 19, ON THE

EM1091'RIGHT-OF-WAY, ON TOP OF A RISE, AT A FIELD ENTRANCE, IN T 5 N, R 12

EM1091'W, NORTH EDGE OF SECTION 24. OWNERSHIP--OKLAHOMA DEPARTMENT OF

EM1091'TRANSPORTATION.

EM1091'TO REACH FROM THE JUNCTION OF U.S. HIGHWAYS 62, 281 AND STATE HIGHWAY

EM1091'19 ON THE NORTH SIDE OF APACHE, GO WEST ON HIGHWAY 19 FOR 3.88 KM

EM1091'(2.40 MI) TO A CROSSROAD (PAVED LEFT, GRAVEL RIGHT). CONTINUE

EM1091'AHEAD, WEST, ON HIGHWAY 19 FOR 0.31 KM (0.20 MI) TO HIGH GROUND AND

EM1091'STATION ON THE LEFT.

EM1091'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN A

EM1091'2.5 CM GREASE FILLED SLEEVE 90 CM LONG ENCASED IN A 12.7 CM PVC PIPE

EM1091'WITH LOGO CAP SURROUNDED BY CONCRETE SET 1 CM BELOW GROUND. IT IS

EM1091'11.7 M (38.4 FT) SOUTH FROM, AND LEVEL WITH THE HIGHWAY CENTER, 3.4

EM1091'M (11.2 FT) NORTH FROM A METAL WITNESS POST, 5.2 M (17.1 FT)

EM1091'NORTHEAST FROM A T-FENCE CORNER, 10.9 M (35.8 FT) EAST FROM THE FIELD

EM1091'ENTRANCE CENTER, 7.3 M (24.0 FT) EAST-SOUTHEAST FROM THE SOUTH END

EM1091'OF A SMALL CONCRETE CULVERT HEADWALL UNDER THE FIELD ROAD, AND 1.0  
M

EM1091'(3.3 FT) WEST FROM A FIBERGLASS WITNESS POST.

EM1091'DESCRIBED BY D.G. AUG

EM1091

EM1091 STATION RECOVERY (2000)

EM1091

EM1091'RECOVERY NOTE BY LOCAL SURVEYOR (INDIVIDUAL OR FIRM) 2000 (DP)

EM1091'RECOVERED IN GOOD CONDITION. NOTE--USED IN LAWTON 2000

MONUMENTATION

EM1091'PROGRAM BY THE CITY OF LAWTON. CONSIDERED GOOD FOR GPS OCCUPATION

EM1091'POINT, NO OBSTRUCTIONS.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FJ1044 \*\*\*\*\*

FJ1044 CBN - This is a Cooperative Base Network Control Station.

**FJ1044 DESIGNATION - UNION**

FJ1044 PID - FJ1044

FJ1044 STATE/COUNTY- OK/GRADY

FJ1044 USGS QUAD - CHICKASHA (1975)

FJ1044

FJ1044 \*CURRENT SURVEY CONTROL

FJ1044

FJ1044\* NAD 83(2007)- 35 00 01.80095(N) 097 53 13.90198(W) ADJUSTED

FJ1044\* NAVD 88 - 357.7 (meters) 1174. (feet) GPS OBS

FJ1044

FJ1044 EPOCH DATE - 2002.00

FJ1044 X - -717,768.656 (meters) COMP

FJ1044 Y - -5,181,185.184 (meters) COMP

FJ1044 Z - 3,638,102.458 (meters) COMP

FJ1044 LAPLACE CORR- 0.83 (seconds) DEFLEC09

FJ1044 ELLIP HEIGHT- 331.401 (meters) (02/10/07) ADJUSTED

FJ1044 GEOID HEIGHT- -26.32 (meters) GEOID09

FJ1044

FJ1044 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FJ1044 Type PID Designation North East Ellip

FJ1044 -----

FJ1044 NETWORK FJ1044 UNION 1.27 1.20 2.96

FJ1044 -----

FJ1044

FJ1044.The horizontal coordinates were established by GPS observations

FJ1044.and adjusted by the National Geodetic Survey in February 2007.

FJ1044

FJ1044.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FJ1044.See [National Readjustment](#) for more information.

FJ1044.The horizontal coordinates are valid at the epoch date displayed above.

FJ1044.The epoch date for horizontal control is a decimal equivalence

FJ1044.of Year/Month/Day.

FJ1044

FJ1044.The orthometric height was determined by GPS observations and a

FJ1044.high-resolution geoid model.

FJ1044

FJ1044.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FJ1044

FJ1044.The Laplace correction was computed from DEFLEC09 derived deflections.

FJ1044

FJ1044.The ellipsoidal height was determined by GPS observations

FJ1044.and is referenced to NAD 83.

FJ1044

FJ1044.The geoid height was determined by GEOID09.

FJ1044

FJ1044; North East Units Scale Factor Converg.

FJ1044;SPC OK S - 184,936.458 610,297.309 MT 0.99996226 +0 03 50.5

FJ1044;SPC OK S - 606,745.70 2,002,283.75 sFT 0.99996226 +0 03 50.5

FJ1044;UTM 14 - 3,873,664.210 601,546.882 MT 0.99972709 +0 38 18.0

FJ1044

FJ1044! - Elev Factor x Scale Factor = Combined Factor

FJ1044!SPC OK S - 0.99994798 x 0.99996226 = 0.99991025

FJ1044!UTM 14 - 0.99994798 x 0.99972709 = 0.99967509

FJ1044

FJ1044: Primary Azimuth Mark

Grid Az

FJ1044:SPC OK S - UNION AZ MK 268 01 28.3

FJ1044:UTM 14 - UNION AZ MK 267 27 00.8

FJ1044

FJ1044|-----|

FJ1044| PID Reference Object Distance Geod. Az |

FJ1044| dddmmss.s |

FJ1044| CL5632 UNION RM 1 8.205 METERS 08727 |

FJ1044| CL5633 UNION RM 2 16.840 METERS 17913 |

FJ1044| CL5631 UNION AZ MK 2680518.8 |

FJ1044| FJ1042 CHICKASHA RADIO STATION KKC 849 MAS APPROX. 2.4 KM 3413308.9 |

FJ1044|-----|

FJ1044

FJ1044 SUPERSEDED SURVEY CONTROL

FJ1044

FJ1044 ELLIP H (04/16/01) 331.411 (m) GP( ) 4 2

FJ1044 NAD 83(1993)- 35 00 01.80058(N) 097 53 13.90198(W) AD( ) B

FJ1044 ELLIP H (05/09/94) 331.454 (m) GP( ) 4 2

FJ1044 NAD 83(1986)- 35 00 01.81176(N) 097 53 13.88882(W) AD( ) 3

FJ1044 NAD 27 - 35 00 01.56959(N) 097 53 12.73417(W) AD( ) 3

FJ1044

FJ1044.Superseded values are not recommended for survey control.

FJ1044.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FJ1044.[See file dsdata.txt](#) to determine how the superseded data were derived.

FJ1044

FJ1044\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPD0154673664(NAD 83)

FJ1044\_MARKER: DS = TRIANGULATION STATION DISK

FJ1044\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FJ1044\_SP\_SET: SQUARE CONCRETE MONUMENT

FJ1044\_STAMPING: UNION 1957

FJ1044\_MARK LOGO: CGS

FJ1044\_MAGNETIC: N = NO MAGNETIC MATERIAL

FJ1044\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FJ1044+STABILITY: SURFACE MOTION

FJ1044\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FJ1044+SATELLITE: SATELLITE OBSERVATIONS - April 01, 2008

FJ1044

FJ1044 HISTORY - Date Condition Report By

FJ1044 HISTORY - 1957 MONUMENTED CGS

FJ1044 HISTORY - 1957 GOOD CGS

FJ1044 HISTORY - 1976 GOOD NGS

FJ1044 HISTORY - 19930412 GOOD NGS

FJ1044 HISTORY - 20021004 GOOD OKDOT

FJ1044 HISTORY - 20040122 GOOD OKDOT

FJ1044 HISTORY - 20080401 GOOD AIRDAT

FJ1044

FJ1044 STATION DESCRIPTION

FJ1044

FJ1044'DESCRIBED BY COAST AND GEODETIC SURVEY 1957 (OSR)

FJ1044'STATION IS LOCATED ON THE RIGHT-OF-WAY OF AN EAST-WEST SECTION

FJ1044'LINE ROAD, ABOUT 3-1/2 MILES EAST AND 2-1/2 MILES SOUTH  
FJ1044'OF CHICKASHA AND 0.4 MILE EAST OF THE UNION HILL SCHOOL, IN  
FJ1044'THE SOUTHEAST 1/4 OF SECTION 12, T. 6. N, R. 7. W.

FJ1044'

FJ1044'TO REACH FROM THE POST OFFICE IN CHICKASHA GO SOUTH ON U.S.  
FJ1044'HIGHWAYS 81 AND 277 FOR 3.9 MILES TO JUNCTION OF STATE HIGHWAY  
FJ1044'19, TURN LEFT, EAST, ON HIGHWAY 19 AND GO 2.3 MILES TO T-ROAD  
FJ1044'LEFT, TURN LEFT, NORTH, AND GO 0.5 MILE TO T-INTERSECTION  
FJ1044'AT UNION HILL SCHOOL AND AZIMUTH MARK ON THE RIGHT, TURN RIGHT,  
FJ1044'EAST, AND GO 0.4 MILE TO FARM HOME AND STATION ON LEFT.

FJ1044'

FJ1044'ALL MARKS ARE STANDARD DISKS SET IN THE TOP OF 10 INCH  
FJ1044'SQUARE, CONCRETE POSTS.

FJ1044'

FJ1044'STATION MARKS ARE STAMPED UNION 1957. THE SURFACE MARK  
FJ1044'PROJECTS 6 INCHES. IT IS 176 FEET SOUTHWEST OF THE SOUTHWEST  
FJ1044'CORNER OF A FARM HOUSE, 167 FEET SOUTH OF THE SOUTHWEST  
FJ1044'CORNER OF A CATTLE SHED, 115 FEET WEST OF A TELEPHONE POLE,  
FJ1044'82 FEET WEST OF A FARM HOME DRIVEWAY, 55 FEET WEST OF A  
FJ1044'FENCE CORNER, 28 FEET NORTH OF AN EAST-WEST SECTION LINE  
FJ1044'ROAD AND 2 FEET SOUTH OF A ROAD RIGHT-OF-WAY FENCE. A 4 IN  
FJ1044'X 4 IN WHITE WITNESS POST WAS SET 4 FEET SOUTHEAST OF THE  
FJ1044'MARK. THE UNDERGROUND MARK IS SET IN AN IRREGULAR MASS  
FJ1044'OF CONCRETE 34 INCHES BELOW THE GROUND SURFACE.

FJ1044'

FJ1044'REFERENCE MARK 1 PROJECTS 2 INCHES AND IS STAMPED UNION  
FJ1044'NO 1 1957. IT IS 168 FEET SOUTH OF THE SOUTHWEST CORNER  
FJ1044'OF THE CATTLE SHED, 164 FEET SOUTHWEST OF THE SOUTHWEST  
FJ1044'CORNER OF THE HOUSE, 89 FEET WEST OF THE TELEPHONE POLE, 56  
FJ1044'FEET WEST OF THE DRIVEWAY, 28 FEET NORTH OF THE CENTER OF  
FJ1044'THE SECTION LINE ROAD, 27 FEET WEST OF THE FENCE CORNER,  
FJ1044'AND 1 FOOT SOUTH OF THE RIGHT-OF-WAY FENCE.

FJ1044'

FJ1044'REFERENCE MARK 2 PROJECTS 4 INCHES AND IS STAMPED UNION NO  
FJ1044'2 1957. IT IS 239 FEET SOUTHWEST OF THE SOUTHWEST CORNER  
FJ1044'OF THE HOUSE, 222 FEET SOUTH OF THE SOUTHWEST CORNER OF  
FJ1044'THE CATTLE SHED, 107 FEET WEST OF A TRANSFORMER POLE, 90  
FJ1044'FEET SOUTHWEST OF THE DRIVEWAY, 78 FEET SOUTHWEST OF THE  
FJ1044'FENCE CORNER, 30 FEET SOUTH OF THE CENTER OF THE SECTION  
FJ1044'LINE ROAD AND 1 FOOT NORTH OF THE RIGHT-OF-WAY FENCE.

FJ1044'

FJ1044'AZIMUTH MARK PROJECTS 6 INCHES AND IS STAMPED UNION 1957.  
FJ1044'IT IS 120 FEET SOUTH OF THE SOUTHEAST CORNER OF THE SCHOOL  
FJ1044'HOUSE, 43 FEET EAST OF A TELEPHONE POLE, 38 FEET SOUTH OF  
FJ1044'THE CENTER OF AN EAST-WEST SECTION LINE ROAD, 24 FEET EAST  
FJ1044'OF A NORTH-SOUTH SECTION LINE ROAD, 2 FEET SOUTHEAST OF  
FJ1044'A POWERLINE POLE. A 4 IN X 4 IN WHITE WITNESS POST WAS  
FJ1044'SET SOUTHWEST OF THE MARK 4 FEET.

FJ1044

FJ1044 STATION RECOVERY (1957)

FJ1044

FJ1044'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1957

FJ1044'RECOVERED IN GOOD CONDITION.

FJ1044

FJ1044 STATION RECOVERY (1976)

FJ1044

FJ1044'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1976 (JLR)  
FJ1044'THE STATION MARK, AZIMUTH MARK, AND REFERENCE MARKS NO. 1 AND NO. 2  
FJ1044'WERE RECOVERED AS DESCRIBED AND IN GOOD CONDITION.

FJ1044

FJ1044 STATION RECOVERY (1993)

FJ1044

FJ1044'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993

FJ1044'STATION IS LOCATED ABOUT 6 KM (3.70 MI) SOUTHEAST OF CHICKASHA, 4 KM  
FJ1044'(2.50 MI) EAST-NORTHEAST OF THE JUNCTION OF US HIGHWAYS 81, 277 AND  
FJ1044'STATE HIGHWAY 19, ALONG A PAVED ROAD, IN A LAWN IN FRONT OF A BRICK  
FJ1044'HOUSE SET BACK FROM THE ROAD, ON THE RIGHT-OF-WAY, AT TOP OF A RISE,  
FJ1044'IN THE SOUTHEAST 1/4 OF SECTION 12. T 6 N, R 7 W. OWNERSHIP--OKLAHOMA  
FJ1044'DEPARTMENT OF TRANSPORTATION.

FJ1044'TO REACH FROM THE UNDERPASS AT THE JUNCTION OF INTERSTATE HIGHWAY 44  
FJ1044'AND US HIGHWAYS 81 AND 277 ON THE SOUTH SIDE OF CHICKASHA, GO SOUTH  
FJ1044'ON HIGHWAYS 81 AND 277 FOR 3.48 KM (2.15 MI) TO THE JUNCTION OF STATE  
FJ1044'HIGHWAY 19 ON THE LEFT. TURN LEFT, EAST, ON HIGHWAY 19 FOR 3.92 KM  
FJ1044'(2.45 MI) TO A PAVED ROAD LEFT. TURN LEFT, NORTH, ON UNION HILL ROAD  
FJ1044'FOR 0.80 KM (0.50 MI) TO A T-ROAD AND THE AZIMUTH MARK ON THE RIGHT.  
FJ1044'TURN RIGHT, EAST, ON COTTONWOOD ROAD FOR 0.58 KM (0.35 MI) TO TOP OF  
FJ1044'RISE AND STATION ON THE LEFT.

FJ1044'STATION MARK IS SET IN THE TOP OF A 30-CM SQUARE CONCRETE POST  
FJ1044'PROJECTING 1 CM ABOVE GROUND. IT IS 8.8 M (28.9 FT) NORTH OF, AND 1  
FJ1044'M (3.3 FT) ABOVE THE ROAD CENTER, 0.3 M (1.0 FT) WEST-NORTHWEST OF A  
FJ1044'METAL WITNESS POST, 0.3 M (1.0 FT) EAST OF A METAL WITNESS POST, 17.7  
FJ1044'M (58.1 FT) WEST-SOUTHWEST OF A UTILITY POLE WITH LINE ACROSS THE  
FJ1044'ROAD, 25.5 M (83.7 FT) WEST OF A GRAVEL DRIVEWAY TO A WHITE FRAME  
FJ1044'HOUSE, AND 29.5 M (96.8 FT) EAST OF THE CENTER OF A GRAVEL DRIVE.

FJ1044

FJ1044 STATION RECOVERY (2002)

FJ1044

FJ1044'RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 2002 (RET)  
FJ1044'RECOVERED IN GOOD CONDITION

FJ1044

FJ1044 STATION RECOVERY (2004)

FJ1044

FJ1044'RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 2004 (GSR)  
FJ1044'RECOVERED IN GOOD CONDITION.

FJ1044

FJ1044 STATION RECOVERY (2008)

FJ1044

FJ1044'RECOVERY NOTE BY AERIAL DATA SERVICE INCORPORATED 2008 (KEG)  
FJ1044'RECOVERED AS DESCRIBED.

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The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL1053 \*\*\*\*\*

EL1053 CBN - This is a Cooperative Base Network Control Station.

**EL1053 DESIGNATION - HOPEWELL**

EL1053 PID - EL1053

EL1053 STATE/COUNTY- OK/ATOKA

EL1053 USGS QUAD - CADDO NORTH (1969)

EL1053

EL1053 \*CURRENT SURVEY CONTROL

EL1053

EL1053\* NAD 83(2007)- 34 11 08.72785(N) 096 22 21.35414(W) ADJUSTED

EL1053\* NAVD 88 - 220.5 (meters) 723. (feet) GPS OBS

EL1053

EL1053 EPOCH DATE - 2002.00

EL1053 X - -586,253.943 (meters) COMP

EL1053 Y - -5,249,233.090 (meters) COMP

EL1053 Z - 3,563,619.302 (meters) COMP

EL1053 LAPLACE CORR- -5.47 (seconds) DEFLEC09

EL1053 ELLIP HEIGHT- 194.214 (meters) (02/10/07) ADJUSTED

EL1053 GEOID HEIGHT- -26.30 (meters) GEOID09

EL1053

EL1053 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL1053 Type PID Designation North East Ellip

EL1053 -----

EL1053 NETWORK EL1053 HOPEWELL 1.59 1.33 3.63

EL1053 -----

EL1053

EL1053.The horizontal coordinates were established by GPS observations

EL1053.and adjusted by the National Geodetic Survey in February 2007.

EL1053

EL1053.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL1053.See [National Readjustment](#) for more information.

EL1053.The horizontal coordinates are valid at the epoch date displayed above.

EL1053.The epoch date for horizontal control is a decimal equivalence

EL1053.of Year/Month/Day.

EL1053

EL1053.The orthometric height was determined by GPS observations and a

EL1053.high-resolution geoid model.

EL1053

EL1053.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL1053

EL1053.The Laplace correction was computed from DEFLEC09 derived deflections.

EL1053

EL1053.The ellipsoidal height was determined by GPS observations

EL1053.and is referenced to NAD 83.

EL1053

EL1053.The geoid height was determined by GEOID09.

EL1053

EL1053; North East Units Scale Factor Converg.

EL1053;SPC OK S - 95,763.031 750,006.591 MT 0.99995997 +0 55 25.5

EL1053;SPC OK S - 314,182.54 2,460,646.62 sFT 0.99995997 +0 55 25.5

EL1053;UTM 14 - 3,785,873.487 742,136.947 MT 1.00032278 +1 28 37.2

EL1053

EL1053! - Elev Factor x Scale Factor = Combined Factor

EL1053!SPC OK S - 0.99996951 x 0.99995997 = 0.99992948

EL1053!UTM 14 - 0.99996951 x 1.00032278 = 1.00029228

EL1053

EL1053 SUPERSEDED SURVEY CONTROL

EL1053

EL1053 ELLIP H (04/16/01) 194.220 (m) GP( ) 4 2

EL1053 NAD 83(1993)- 34 11 08.72753(N) 096 22 21.35413(W) AD( ) B

EL1053 ELLIP H (05/09/94) 194.278 (m) GP( ) 4 2

EL1053

EL1053.Superseded values are not recommended for survey control.

EL1053.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL1053.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL1053

EL1053\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SQC4213685873(NAD 83)

EL1053\_MARKER: I = METAL ROD

EL1053\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

EL1053\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

EL1053\_STAMPING: HOPEWELL 1993

EL1053\_MARK LOGO: NGS

EL1053\_PROJECTION: RECESSED 2 CENTIMETERS

EL1053\_MAGNETIC: N = NO MAGNETIC MATERIAL

EL1053\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

EL1053\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL1053+SATELLITE: SATELLITE OBSERVATIONS - 1993

EL1053\_ROD/PIPE-DEPTH: 3.2 meters

EL1053\_SLEEVE-DEPTH : .9 meters

EL1053

EL1053 HISTORY - Date Condition Report By

EL1053 HISTORY - 1993 MONUMENTED NGS

EL1053

EL1053 STATION DESCRIPTION

EL1053

EL1053'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

EL1053'THE STATION IS LOCATED ABOUT 22 KM (13.65 MI) NORTH OF DURANT, 13 KM

EL1053'(8.05 MI) WEST OF U.S. HIGHWAY 69 AND 75, 4 KM (2.50 MI) EAST OF

EL1053'FOLSOM, IN GRASS AND BRUSH, ON THE WEST EDGE OF A LARGE OPEN PASTURE,

EL1053'IN THE SOUTHEAST QUADRANT OF THE INTERSECTION OF COOPER CREEK ROAD

EL1053'AND HOPEWELL ROAD, AND IN THE ROAD RIGHT-OF-WAY. OWNERSIP--

OKLAHOMA

EL1053'DEPARTMENT OF TRANSPORTATION.

EL1053'TO REACH FROM THE JUNCTION OF STATE HIGHWAYS 22 AND 48, ABOUT 1 KM

EL1053'(0.60 MI) WEST OF KENEFIC, GO NORTH AND NORTHWEST ON HIGHWAY 48 FOR

EL1053'2.27 KM (1.40 MI) TO THE ATOKA COUNTY LINE JUST AFTER A SMALL BRIDGE.

EL1053'CONTINUE AHEAD, NORTHWEST, ON HIGHWAY 48 FOR 4.46 KM (2.75 MI) TO A

EL1053'GRAVEL AND DIRT CROSSROAD (COOPER CREEK ROAD), ABOUT 0.8 KM

EL1053'(0.50 MI) SOUTHEAST OF THE FOLSOM FREEWILL BAPTIST CHURCH. TURN

EL1053'RIGHT, EAST, ON COOPER CREEK ROAD FOR 4.18 KM (2.60 MI) TO THE

EL1053'T-JUNCTION OF HOPEWELL ROAD. TURN RIGHT, SOUTH, ON HOPEWELL ROAD

FOR

EL1053'ABOUT 45 M (147.6 FT) TO THE STATION ON THE LEFT.

EL1053'THE STATION IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN A

EL1053'2.5 CM GREASE FILLED SLEEVE 90 CM LONG ENCASED IN A 12.7 CM PVC PIPE



EL1053 WITH A LOGO CAP SURROUNDED BY CONCRETE SET 2 CM BELOW THE GROUND.  
IT  
EL1053 IS 45.7 M (149.9 FT) SOUTH FROM THE EXTENDED CENTER OF COPPER CREEK  
EL1053 ROAD, 8.1 M (26.6 FT) EAST FROM THE CENTER OF, AND LEVEL WITH  
EL1053 HOPEWELL ROAD, 0.7 M (2.3 FT) WEST FROM A FENCE, 0.65 M (2.13 FT)  
EL1053 SOUTH FROM A FIBERGLASS WITNESS POST, 0.66 M WEST OF A METAL WITNESS  
EL1053 POST, AND 0.65 M (2.13 FT) NORTH FROM A FIBERGLASS WITNESS POST.  
EL1053 DESCRIBED BY D.G. AUG.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0205 \*\*\*\*\*

**FK0205 DESIGNATION - M 173**

FK0205 PID - FK0205

FK0205 STATE/COUNTY- OK/CUSTER

FK0205 USGS QUAD - CLINTON (1983)

FK0205

FK0205 \*CURRENT SURVEY CONTROL

FK0205

FK0205\* NAD 83(2007)- 35 31 22.55895(N) 098 56 25.20797(W) NO CHECK

FK0205\* NAVD 88 - 477.122 (meters) 1565.36 (feet) ADJUSTED

FK0205

FK0205 EPOCH DATE - 2002.00

FK0205 X - -807,690.782 (meters) COMP

FK0205 Y - -5,134,155.880 (meters) COMP

FK0205 Z - 3,685,500.532 (meters) COMP

FK0205 LAPLACE CORR- 2.59 (seconds) DEFLEC09

FK0205 ELLIP HEIGHT- 449.887 (meters) (02/10/07) NO CHECK

FK0205 GEOID HEIGHT- -27.23 (meters) GEOID09

FK0205 DYNAMIC HT - 476.645 (meters) 1563.79 (feet) COMP

FK0205

FK0205 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FK0205 Type PID Designation North East Ellip

FK0205 -----

FK0205 NETWORK FK0205 M 173 1.61 1.90 4.43

FK0205 -----

FK0205 MODELED GRAV- 979,619.1 (mgal) NAVD 88

FK0205

FK0205 VERT ORDER - FIRST CLASS II

FK0205

FK0205.The horizontal coordinates were established by GPS observations

FK0205.and adjusted by the National Geodetic Survey in February 2007.

FK0205

FK0205.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FK0205.See [National Readjustment](#) for more information.

FK0205.No horizontal observational check was made to the station.

FK0205.The horizontal coordinates are valid at the epoch date displayed above.

FK0205.The epoch date for horizontal control is a decimal equivalence

FK0205.of Year/Month/Day.

FK0205

FK0205.The orthometric height was determined by differential leveling and

FK0205.adjusted in June 1991.

FK0205

FK0205.[Photographs](#) are available for this station.

FK0205

FK0205.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0205

FK0205.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0205

FK0205.The ellipsoidal height was determined by GPS observations

FK0205.and is referenced to NAD 83.

FK0205

FK0205.The geoid height was determined by GEOID09.

FK0205

FK0205.The dynamic height is computed by dividing the NAVD 88

FK0205.geopotential number by the normal gravity value computed on the

FK0205.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0205.degrees latitude (g = 980.6199 gals.).

FK0205

FK0205.The modeled gravity was interpolated from observed gravity values.

FK0205

FK0205; North East Units Scale Factor Converg.

FK0205;SPC OK N - 58,434.271 514,708.816 MT 1.00000823 -0 33 17.8

FK0205;SPC OK N - 191,713.10 1,688,673.84 sFT 1.00000823 -0 33 17.8

FK0205;UTM 14 - 3,931,038.496 505,409.616 MT 0.99960036 +0 02 04.8

FK0205

FK0205! - Elev Factor x Scale Factor = Combined Factor

FK0205!SPC OK N - 0.99992939 x 1.00000823 = 0.99993762

FK0205!UTM 14 - 0.99992939 x 0.99960036 = 0.99952978

FK0205

FK0205 SUPERSEDED SURVEY CONTROL

FK0205

FK0205 NAD 83(1993)- 35 31 22.55866(N) 098 56 25.20765(W) AD( ) 1

FK0205 ELLIP H (03/07/02) 449.897 (m) GP( ) 4 2

FK0205 NAVD 88 (03/07/02) 477.12 (m) 1565.4 (f) LEVELING 3

FK0205 NGVD 29 (??/??/92) 476.918 (m) 1564.69 (f) ADJ UNCH 1 2

FK0205

FK0205.Superseded values are not recommended for survey control.

FK0205.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0205.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0205

FK0205\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE0540931038(NAD 83)

FK0205\_MARKER: DB = BENCH MARK DISK

FK0205\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0205\_SP\_SET: SET IN TOP OF CONCRETE MONUMENT

FK0205\_STAMPING: M 173 1953

FK0205\_MARK LOGO: CGS

FK0205\_PROJECTION: RECESSED 10 CENTIMETERS

FK0205\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0205\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0205+STABILITY: SURFACE MOTION

FK0205\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0205+SATELLITE: SATELLITE OBSERVATIONS - July 26, 2006

FK0205

FK0205 HISTORY - Date Condition Report By

FK0205 HISTORY - 1953 MONUMENTED CGS

FK0205 HISTORY - 1955 GOOD NGS

FK0205 HISTORY - 20010531 GOOD MSAM

FK0205 HISTORY - 20060726 GOOD GEOCAC

FK0205

FK0205 STATION DESCRIPTION

FK0205

FK0205'DESCRIBED BY NATIONAL GEODETIC SURVEY 1955

FK0205'2.4 MI E FROM CLINTON.

FK0205'1.8 MILES SOUTHEAST ALONG THE CHICAGO, ROCK ISLAND AND PACIFIC

FK0205'RAILROAD FROM THE STATION AT CLINTON, THENCE 0.55 MILE NORTH

FK0205'ALONG AN OILED ROAD, 46 FEET EAST OF THE CENTER LINE OF A NORTH

FK0205'AND SOUTH ROAD, 35 FEET SOUTH OF THE CENTER LINE OF AN EAST AND  
FK0205'WEST ROAD, 6 FEET EAST OF A TELEPHONE POLE, 1.6 FEET NORTH OF A  
FK0205'FENCE, 2 FEET EAST OF A WITNESS POST, SET IN THE TOP OF A  
FK0205'CONCRETE POST WHICH PROJECTS 0.4 FOOT ABOVE THE GROUND.

FK0205

FK0205 STATION RECOVERY (2001)

FK0205

FK0205'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 2001 (KCH)  
FK0205'DESCRIBED BY MOUNTAIN SURVEYING AND MAPPING, INC. MSAM 2001 (KCH)  
FK0205'THE STATION IS LOCATED 2.6 KM (1.6 MI) NORTHEAST OF CLINTON, OKLAHOMA  
FK0205'AND

FK0205'20.9 KM (13. MI) WEST OF WEATHERFORD, OKLAHOMA, IN THE SOUTHEAST  
FK0205'CORNER

FK0205'OF THE INTERSECTION OF DOUGHERTY AND AIRPORT ROAD. OWNERSHIP-  
FK0205'

FK0205'TO REACH THE STATION FROM INTERSTATE HIGHWAY 40 (EXIT 66) AND US  
FK0205'HIGHWAY

FK0205'183, IN SOUTHEAST CLINTON, OKLAHOMA, GO 1.6 KM (1 MI) NORTH ON HIGHWAY  
FK0205'183

FK0205'TO INTERSTATE 40 BUSINESS ROUTE (GARY FREEWAY). TURN RIGHT, EAST, ON  
FK0205'GARY FREEWAY FOR 2.25 KM (1.4 MI) TO AIRPORT ROAD (COUNTY ROAD N2270).  
FK0205'TURN

FK0205'LEFT, NORTH, ON AIRPORT ROAD FOR 0.9 KM (0.6 MI) TO DOUGHERTY ROAD  
FK0205'AND

FK0205'THE STATION ON THE RIGHT.

FK0205'

FK0205'THE STATION IS A US COAST AND GEODETIC SURVEY BENCHMARK DISK SET IN  
FK0205'THE

FK0205'TOP CENTER OF A CONCRETE POST RECESSED 10 CM (0.4 FT) BELOW THE  
FK0205'SURFACE.

FK0205'IT IS 28.3 M (92.8 FT) SOUTHEAST OF A CHISELED -X- IN A HEADWALL IN  
FK0205'THE

FK0205'NORTHWEST CORNER OF THE INTERSECTION, 17.8 M (58.4 FT) SOUTHEAST OF A  
FK0205'RAILROAD SPIKE SET AT THE INTERSECTION OF THE TWO ROAD CENTERLINES  
AND

FK0205'6.5 M (21.3 FT) NORTHEAST OF A POWER POLE WITH A SHINER.

FK0205'

FK0205'

FK0205'

FK0205

FK0205 STATION RECOVERY (2006)

FK0205

FK0205'RECOVERY NOTE BY GEOCACHING 2006 (BRY)

FK0205'RECOVERED IN GOOD CONDITION.

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL0783 \*\*\*\*\*

EL0783 CBN - This is a Cooperative Base Network Control Station.

## EL0783 DESIGNATION - MANN

EL0783 PID - EL0783

EL0783 STATE/COUNTY- OK/JOHNSTON

EL0783 USGS QUAD - MANNSVILLE (1978)

EL0783

EL0783 \*CURRENT SURVEY CONTROL

EL0783

EL0783\* NAD 83(2007)- 34 12 05.78747(N) 096 53 24.01390(W) ADJUSTED

EL0783\* NAVD 88 - 224.535 (meters) 736.66 (feet) ADJUSTED

EL0783

EL0783 EPOCH DATE - 2002.00

EL0783 X - -633,514.124 (meters) COMP

EL0783 Y - -5,242,747.652 (meters) COMP

EL0783 Z - 3,565,076.074 (meters) COMP

EL0783 LAPLACE CORR- 1.29 (seconds) DEFLEC09

EL0783 ELLIP HEIGHT- 198.618 (meters) (02/10/07) ADJUSTED

EL0783 GEOID HEIGHT- -25.92 (meters) GEOID09

EL0783 DYNAMIC HT - 224.305 (meters) 735.91 (feet) COMP

EL0783

EL0783 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL0783 Type PID Designation North East Ellip

EL0783 -----

EL0783 NETWORK EL0783 MANN 1.20 1.00 2.92

EL0783 -----

EL0783 MODELED GRAV- 979,604.9 (mgal) NAVD 88

EL0783

EL0783 VERT ORDER - FIRST CLASS II

EL0783

EL0783.The horizontal coordinates were established by GPS observations

EL0783.and adjusted by the National Geodetic Survey in February 2007.

EL0783

EL0783.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL0783.See [National Readjustment](#) for more information.

EL0783.The horizontal coordinates are valid at the epoch date displayed above.

EL0783.The epoch date for horizontal control is a decimal equivalence

EL0783.of Year/Month/Day.

EL0783

EL0783.The orthometric height was determined by differential leveling and

EL0783.adjusted in August 1994.

EL0783

EL0783.[Photographs](#) are available for this station.

EL0783

EL0783.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL0783

EL0783.The Laplace correction was computed from DEFLEC09 derived deflections.

EL0783

EL0783.The ellipsoidal height was determined by GPS observations

EL0783.and is referenced to NAD 83.

EL0783

EL0783.The geoid height was determined by GEOID09.

EL0783

EL0783.The dynamic height is computed by dividing the NAVD 88

EL0783.geopotential number by the normal gravity value computed on the

EL0783.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

EL0783.degrees latitude (g = 980.6199 gals.).

EL0783

EL0783.The modeled gravity was interpolated from observed gravity values.

EL0783

EL0783;                      North      East      Units Scale Factor Converg.  
 EL0783;SPC OK S    - 96,874.333 702,297.509 MT 0.99995810 +0 37 48.2  
 EL0783;SPC OK S    - 317,828.54 2,304,121.08 sFT 0.99995810 +0 37 48.2  
 EL0783;UTM 14    - 3,786,522.903 694,408.335 MT 1.00006590 +1 11 11.1

EL0783

EL0783!                      - Elev Factor x Scale Factor = Combined Factor

EL0783!SPC OK S    - 0.99996882 x 0.99995810 = 0.99992692

EL0783!UTM 14    - 0.99996882 x 1.00006590 = 1.00003472

EL0783

EL0783:                      Primary Azimuth Mark                      Grid Az  
 EL0783:SPC OK S    - MANN AZ MK                              087 52 41.7  
 EL0783:UTM 14    - MANN AZ MK                              087 19 18.8

EL0783

PID	Reference Object	Distance dddmss.s	Geod. Az
EL1071	MANN AZ MK		0883029.9
EL0781	RBN MANNSVILLE MVI S MAST 1955	312.820 METERS	18157
EL0782	RBN MANNSVILLE MVI N MAST 1955	254.050 METERS	18215
EL1070	MANN RM 1	8.085 METERS	26941
CY1560	MANN RM 2	14.397 METERS	35331

EL0783

EL0783 SUPERSEDED SURVEY CONTROL

EL0783

EL0783 ELLIP H (04/16/01) 198.629 (m) GP( ) 4 2  
 EL0783 NAD 83(1993)- 34 12 05.78706(N) 096 53 24.01388(W) AD( ) B  
 EL0783 ELLIP H (05/09/94) 198.684 (m) GP( ) 4 2  
 EL0783 NAD 83(1986)- 34 12 05.79674(N) 096 53 24.00762(W) AD( ) 2  
 EL0783 NAD 27 - 34 12 05.45440(N) 096 53 22.97890(W) AD( ) 2  
 EL0783 NAVD 88 (01/13/95) 224.53 (m) 736.6 (f) LEVELING 3

EL0783

EL0783.Superseded values are not recommended for survey control.

EL0783.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL0783.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL0783

EL0783\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPC9440886522(NAD 83)  
 EL0783\_MARKER: DS = TRIANGULATION STATION DISK  
 EL0783\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT  
 EL0783\_SP\_SET: CONCRETE POST  
 EL0783\_STAMPING: MANN 1955  
 EL0783\_MARK LOGO: CGS  
 EL0783\_MAGNETIC: N = NO MAGNETIC MATERIAL  
 EL0783\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO  
 EL0783+STABILITY: SURFACE MOTION  
 EL0783\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL0783+SATELLITE: SATELLITE OBSERVATIONS - January 18, 2009

EL0783

EL0783 HISTORY	- Date	Condition	Report By
EL0783 HISTORY	- 1955	MONUMENTED	CGS
EL0783 HISTORY	- 1955	GOOD	CGS
EL0783 HISTORY	- 1980	GOOD	LOCENG
EL0783 HISTORY	- 19930504	GOOD	NGS
EL0783 HISTORY	- 19940228	GOOD	NGS
EL0783 HISTORY	- 20021025	GOOD	JCLS
EL0783 HISTORY	- 20090118	GOOD	AIRDAT

EL0783

STATION DESCRIPTION

EL0783

EL0783'DESCRIBED BY COAST AND GEODETIC SURVEY 1955 (RLE)

EL0783'THE STATION IS LOCATED ABOUT 1-1/2 MILES NORTH-NORTHWEST OF  
EL0783'MANNSVILLE NEAR THE SITE OF THE UNITED STATES AIR FORCE HOMING  
EL0783'BEACON 299 MVI. IT IS 40 FEET EAST OF THE CENTER OF A GATE  
EL0783'LEADING INTO THE HOMING BEACON, 27 FEET SOUTH OF THE CENTER  
EL0783'OF A GRAVELED ROAD, 5 FEET SOUTHWEST OF A WITNESS POST AND  
EL0783'1 FOOT SOUTH OF A FENCE. IT IS SET FLUSH WITH THE SURFACE  
EL0783'OF THE GROUND AND THE DISK IS STAMPED MANN 1955.

EL0783'

EL0783'REFERENCE MARK NO. 1 IS 27 FEET SOUTH OF THE CENTER OF A  
EL0783'GRAVELED ROAD, 14 FEET EAST OF THE CENTER OF A GATE LEADING  
EL0783'INTO THE HOMING BEACON AND 1 FOOT SOUTH OF A FENCE. IT IS  
EL0783'SET FLUSH WITH THE SURFACE OF THE GROUND AND THE DISK IS  
EL0783'STAMPED MANN NO 1 1955.

EL0783'

EL0783'REFERENCE MARK NO. 2 IS ACROSS THE ROAD FROM THE STATION,  
EL0783'20 FEET NORTH OF THE CENTER OF A GRAVELED ROAD AND 1.5 FEET  
EL0783'SOUTH OF A WOVEN WIRE FENCE. IT PROJECTS 4 INCHES ABOVE  
EL0783'THE SURFACE OF THE GROUND AND THE DISK IS STAMPED MANN NO 2  
EL0783'1955.

EL0783'

EL0783'THE AZIMUTH MARK IS 36 FEET WEST-SOUTHWEST OF A POWERLINE  
EL0783'POLE, 28 FEET NORTH OF THE CENTER OF A GRAVELED ROAD, 1.5  
EL0783'FEET SOUTH OF A FENCE, AND 1.5 FEET SOUTHWEST OF A WITNESS  
EL0783'POST. IT PROJECTS 3 INCHES ABOVE THE SURFACE OF THE GROUND  
EL0783'AND THE DISK IS STAMPED MANN 1955.

EL0783'

EL0783'TRAVERSE CONNECTIONS WERE MADE TO MANNSVILLE, 299 MVI MAST  
EL0783'SOUTH AND NORTH.

EL0783'

EL0783'TO REACH THE STATION FROM THE CROSSROAD JUST EAST OF THE  
EL0783'POST OFFICE IN MANNSVILLE, GO NORTH ON A GRAVELED ROAD FOR 1.0 MILE  
EL0783'TO A CROSSROAD, TURN LEFT AND GO WEST ON A GRAVELED ROAD  
EL0783'FOR 0.15 MILE TO A POWERLINE POLE ON THE RIGHT AND THE AZIMUTH  
EL0783'MARK AS DESCRIBED. CONTINUE WEST ON A GRAVELED ROAD FOR 0.4  
EL0783'MILE TO A GATE AND SIGN USAF HOMING BEACON ON THE LEFT AND  
EL0783'THE STATION AS DESCRIBED.

EL0783

STATION RECOVERY (1955)

EL0783

EL0783'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1955

EL0783'RECOVERED IN GOOD CONDITION.

EL0783

EL0783 STATION RECOVERY (1980)  
EL0783  
EL0783'RECOVERY NOTE BY LOCAL ENGINEER (INDIVIDUAL OR FIRM) 1980 (MDC)  
EL0783'MANN TRI-STATION RECOVERED EXCELLENT (1955 MANN).  
EL0783'  
EL0783'RM NO. 1 RECOVERED EXCELLENT (MANN RM NO. 1).  
EL0783'  
EL0783'RM NO. 2 MISSING.  
EL0783'  
EL0783'AZIMUTH MARK FOUND IN GOOD CONDITION AND REFERENCED BELOW.  
EL0783'  
EL0783'PROPERTY OWNER HAS PLACED T-BAR FENCE POST AT T.S. AND RM 1.  
EL0783'  
EL0783'DISTANCE AND DIRECTION FROM NEAREST TOWN--1-1/2 NNW OF MANNSVILLE.  
EL0783  
EL0783 STATION RECOVERY (1993)  
EL0783  
EL0783'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993  
EL0783'THE STATION AND RM 1 WERE RECOVERED IN GOOD CONDITION. RM 2 AND THE  
EL0783'AZIMUTH WERE SEARCHED FOR BUT NOT FOUND.  
EL0783'NOTE--CONES SHOULD BE USED AROUND VEHICLE WHEN OCCUPYING THIS  
STATION.  
EL0783'THE STATION IS LOCATED ABOUT 37 KM (23.00 MI) SOUTH-SOUTHEAST OF  
EL0783'SULPHUR, 26 KM (16.15 MI) EAST OF ARDMORE, 2 KM (1.25 MI) NORTH OF  
EL0783'MANNSVILLE IN GRASS NEAR THE NORTHWEST CORNER OF A LARGE OPEN  
EL0783'PASTURE. OWNERSHIP--DENNIS JAMES, BOX 321, MANNSVILLE, OK 73447.  
EL0783'PHONE 405-371-3965. CONTACT HIM IN ADVANCE TO LET HIM KNOW WHEN YOU  
EL0783'WILL BE OCCUPYING THIS STATION.  
EL0783'TO REACH FROM THE T-JUNCTION OF US HIGHWAY 177 AND STATE HIGHWAY 1  
EL0783'ABOUT 5 KM (3.10 MI) SOUTHEAST OF MANNSVILLE, GO NORTHWEST ON  
EL0783'HIGHWAY 177 FOR 2.48 KM (1.55 MI) TO A BRIDGE OVER TURKEY CREEK.  
EL0783'CONTINUE AHEAD, NORTHWEST, ON HIGHWAY 177 FOR 2.5 KM (1.55 MI) TO A  
EL0783'PAVED CROSSROAD (GRAND AVENUE) IN THE CENTER OF THE TOWN OF  
EL0783'MANNSVILLE. TURN RIGHT, NORTH, ON GRAND AVENUE FOR 1.73 KM (1.05 MI)  
EL0783'TO A PAVED ROAD ON THE LEFT AND A GRAVEL ROAD ON THE RIGHT. TURN  
EL0783'LEFT, WEST, ON THE PAVED ROAD FOR 0.73 KM (0.45 MI) TO THE DRIVEWAY  
EL0783'TO A FARM HOUSE ON THE LEFT. CONTINUE AHEAD, WEST, ON THE PAVED ROAD  
EL0783'FOR 0.14 KM (0.10 MI) TO THE STATION ON THE LEFT.  
EL0783'THE STATION IS SET IN THE TOP OF A 35 CM ROUND CONCRETE POST  
EL0783'PROJECTING 20 CM. IT IS 16.9 M (55.4 FT) EAST FROM A STEEL FENCE  
EL0783'CORNER POST, 8.0 M (26.2 FT) SOUTH FROM THE CENTER OF THE PAVED  
EL0783'ROAD, 0.9 M (3.0 FT) SOUTH FROM A FENCE, AND 0.3 M (1.0 FT)  
EL0783'NORTHWEST FROM A STEEL WITNESS POST.  
EL0783'DESCRIBED BY D.G. AUG  
EL0783  
EL0783 STATION RECOVERY (1994)  
EL0783  
EL0783'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1994  
EL0783'0.1 KM (0.05 MI) EASTERLY ALONG STATE HIGHWAY 199 FROM THE POST OFFICE  
EL0783'IN MANNSVILLE, THENCE 1.7 KM (1.05 MI) NORTHERLY ALONG GRAND AVENUE,  
EL0783'THENCE 0.9 KM (0.55 MI) WESTERLY ALONG A PAVED ROAD, 16.9 M  
EL0783'(55.4 FT) EAST OF A FENCE CORNER, 8.4 M (27.6 FT) SOUTH OF AND LEVEL  
EL0783'WITH THE ROAD CENTER, 8.1 M (26.6 FT) EAST OF REFERENCE MARK 1, 0.9 M  
EL0783'(3.0 FT) SOUTH OF A FENCE, 0.3 M (1.0 FT) NORTHWEST OF A WITNESS  
EL0783'POST, AND THE MONUMENT PROJECTS 0.2 M (0.7 FT) ABOVE THE GROUND  
EL0783'SURFACE. NOTE--THE MONUMENT IS ON PROPERTY OWNED BY DENNIS JAMES,



EL0783'BOX 321, MANNSVILLE, OK 73447, TELEPHONE NUMBER (405) 371-3965.

EL0783

EL0783 STATION RECOVERY (2002)

EL0783

EL0783'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2002 (MRY)

EL0783'RECOVERED IN GOOD CONDITION.

EL0783

EL0783 STATION RECOVERY (2009)

EL0783

EL0783'RECOVERY NOTE BY AERIAL DATA SERVICE INCORPORATED 2009 (KEG)

EL0783'RECOVERED IN GOOD CONDITION.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0328 \*\*\*\*\*

**FK0328 DESIGNATION - V 174**

FK0328 PID - FK0328

FK0328 STATE/COUNTY- OK/BECKHAM

FK0328 USGS QUAD - CANUTE (1987)

FK0328

FK0328 \*CURRENT SURVEY CONTROL

FK0328

FK0328\* NAD 83(1993)- 35 23 48.02862(N) 099 21 52.09953(W) ADJUSTED

FK0328\* NAVD 88 - 603.269 (meters) 1979.22 (feet) ADJUSTED

FK0328

FK0328 X - -847,013.393 (meters) COMP

FK0328 Y - -5,136,156.319 (meters) COMP

FK0328 Z - 3,674,162.541 (meters) COMP

FK0328 LAPLACE CORR- -0.41 (seconds) DEFLEC09

FK0328 ELLIP HEIGHT- 575.658 (meters) (11/28/94) ADJUSTED

FK0328 GEOID HEIGHT- -27.17 (meters) GEOID09

FK0328 DYNAMIC HT - 602.641 (meters) 1977.16 (feet) COMP

FK0328 MODELED GRAV- 979,572.5 (mgal) NAVD 88

FK0328

FK0328 HORZ ORDER - SECOND

FK0328 VERT ORDER - FIRST CLASS II

FK0328 ELLP ORDER - FIFTH CLASS I

FK0328

FK0328.The horizontal coordinates were established by GPS observations

FK0328.and adjusted by the National Geodetic Survey in November 1994.

FK0328

FK0328.The orthometric height was determined by differential leveling and

FK0328.adjusted in June 1991.

FK0328

FK0328.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0328

FK0328.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0328

FK0328.The ellipsoidal height was determined by GPS observations

FK0328.and is referenced to NAD 83.

FK0328

FK0328.The geoid height was determined by GEOID09.

FK0328

FK0328.The dynamic height is computed by dividing the NAVD 88

FK0328.geopotential number by the normal gravity value computed on the

FK0328.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0328.degrees latitude (g = 980.6199 gals.).

FK0328

FK0328.The modeled gravity was interpolated from observed gravity values.

FK0328

FK0328; North East Units Scale Factor Converg.

FK0328;SPC OK S - 229,721.559 476,043.210 MT 1.00003636 -0 46 28.2

FK0328;SPC OK S - 753,678.15 1,561,818.43 sFT 1.00003636 -0 46 28.2

FK0328;UTM 14 - 3,917,095.191 466,902.545 MT 0.99961350 -0 12 40.0

FK0328

FK0328! - Elev Factor x Scale Factor = Combined Factor  
 FK0328!SPC OK S - 0.99990965 x 1.00003636 = 0.99994601  
 FK0328!UTM 14 - 0.99990965 x 0.99961350 = 0.99952319

FK0328

FK0328 SUPERSEDED SURVEY CONTROL

FK0328

FK0328 NAD 83(1986)- 35 23 48.03391(N) 099 21 52.08807(W) AD( ) 2

FK0328 NGVD 29 (??/??/92) 603.013 (m) 1978.39 (f) ADJ UNCH 1 2

FK0328

FK0328.Superseded values are not recommended for survey control.

FK0328.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0328.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0328

FK0328\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME6690217095(NAD 83)

FK0328\_MARKER: DB = BENCH MARK DISK

FK0328\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0328\_SP\_SET: CONCRETE POST

FK0328\_STAMPING: V 174 1953

FK0328\_MARK LOGO: CGS

FK0328\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0328\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0328+STABILITY: SURFACE MOTION

FK0328\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0328+SATELLITE: SATELLITE OBSERVATIONS - May 09, 2007

FK0328

FK0328 HISTORY - Date Condition Report By

FK0328 HISTORY - 1953 MONUMENTED CGS

FK0328 HISTORY - 19890301 GOOD NGS

FK0328 HISTORY - 20070509 GOOD INDIV

FK0328

FK0328 STATION DESCRIPTION

FK0328

FK0328'DESCRIBED BY COAST AND GEODETIC SURVEY 1953

FK0328'2.3 MI E FROM ELK CITY.

FK0328'2.3 MILES EAST ALONG THE CHICAGO, ROCK ISLAND AND PACIFIC RAILROAD

FK0328'FROM THE STATION AT ELK CITY, AT THE BECKHAM AND WASHITA COUNTY

FK0328'LINE, 66 FEET SOUTHWEST OF THE CENTER OF A DIRT ROAD CROSSING,

FK0328'46 FEET SOUTH OF THE SOUTH RAIL, 33 FEET WEST OF THE CENTER LINE

FK0328'OF A ROAD, 3 FEET NORTH OF A FENCE CORNER, 2.4 FEET SOUTHWEST

FK0328'OF A WITNESS POST, SET IN THE TOP OF A CONCRETE POST WHICH

FK0328'PROJECTS 0.9 FOOT ABOVE THE GROUND.

FK0328

FK0328 STATION RECOVERY (1989)

FK0328

FK0328'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1989

FK0328'THE STATION WAS RECOVERED IN GOOD CONDITION, A NEW DESCRIPTION

FK0328'FOLLOWS.

FK0328'THE STATION IS LOCATED ABOUT 8.1 KM (5.05 MI) SOUTHWEST OF CANUTE, 4.2

FK0328'KM (2.60 MI) SOUTHEAST OF ELK CITY, AND 2.6 KM (1.60 MI) SOUTH OF

FK0328'INTERSTATE HIGHWAY 40. OWNERSHIP--STATE HIGHWAY DEPARTMENT.

FK0328'TO REACH THE STATION FROM THE JUNCTION OF INTERSTATE HIGHWAY 40

FK0328'BUSINESS AND STATE HIGHWAY 6 IN THE CENTER OF ELK CITY, GO SOUTH ON

FK0328'HIGHWAY 6 FOR 2.6 KM (1.60 MI) TO THE INTERSTATE HIGHWAY 40 OVERPASS.

FK0328'CONTINUE SOUTH ON HIGHWAY 6 FOR 0.4 KM (0.25 MI) TO A PAVED CROSSROAD.

FK0328'TURN LEFT AND GO EAST FOR 61.0 M (200.1 FT) TO A PAVED ROAD ON THE

FK0328'LEFT, AT A PHILLIPS 66 SERVICE STATION. TURN LEFT AND GO NORTH AND  
FK0328'EAST ON THE PAVED ROAD FOR 3.8 KM (2.35 MI) TO A GRAVELED CROSSROAD,  
FK0328'WASHITA COUNTY LINE. TURN LEFT AND GO NORTH ON THE GRAVELED ROAD  
FOR

FK0328'0.4 KM (0.25 MI) TO THE STATION ON THE LEFT, JUST BEFORE CROSSING THE  
FK0328'FARMRAIL RAILROAD TRACKS.

FK0328'THE STATION IS A STANDARD CGS DISK SET IN THE TOP OF A 30 CM ROUND  
FK0328'CONCRETE POST THAT PROJECTING 20 CM ABOVE THE GROUND. LOCATED 21.1 M  
FK0328'(69.2 FT) SOUTHWEST OF THE CENTER OF THE CROSSING, 15.0 M (49.2 FT)  
FK0328'SOUTH OF THE NEAR RAIL, 10.4 M (34.1 FT) WEST OF THE CENTER OF THE  
FK0328'GRAVELED ROAD, 1.2 M (3.9 FT) WEST OF AN UNDERGROUND CABLE WARNING  
FK0328'SIGNPOST, 1.0 M (3.3 FT) NORTH OF A FENCE CORNER POST, AND 0.9 M  
FK0328'(3.0 FT) EAST OF A CARSONITE WITNESS POST.

FK0328'DESCRIBED BY E.J. HANSMANN, TYPED BY RLZ.

FK0328

STATION RECOVERY (2007)

FK0328

FK0328'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2007 (DJK)

FK0328'DESCRIPTION IS ADEQUATE.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL0811 \*\*\*\*\*

EL0811 CBN - This is a Cooperative Base Network Control Station.

## EL0811 DESIGNATION - JESSE

EL0811 PID - EL0811

EL0811 STATE/COUNTY- OK/PONTOTOC

EL0811 USGS QUAD - HARDEN CITY (1966)

EL0811

EL0811 \*CURRENT SURVEY CONTROL

EL0811

EL0811\* NAD 83(2007)- 34 35 02.56197(N) 096 31 46.02052(W) ADJUSTED

EL0811\* NAVD 88 - 233.2 (meters) 765. (feet) GPS OBS

EL0811

EL0811 EPOCH DATE - 2002.00

EL0811 X - -597,785.664 (meters) COMP

EL0811 Y - -5,222,828.234 (meters) COMP

EL0811 Z - 3,600,088.964 (meters) COMP

EL0811 LAPLACE CORR- -6.73 (seconds) DEFLEC09

EL0811 ELLIP HEIGHT- 206.700 (meters) (02/10/07) ADJUSTED

EL0811 GEOID HEIGHT- -26.48 (meters) GEOID09

EL0811

EL0811 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL0811 Type PID Designation North East Ellip

EL0811 -----

EL0811 NETWORK EL0811 JESSE 1.65 1.53 3.94

EL0811 -----

EL0811

EL0811.The horizontal coordinates were established by GPS observations

EL0811.and adjusted by the National Geodetic Survey in February 2007.

EL0811

EL0811.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL0811.See [National Readjustment](#) for more information.

EL0811.The horizontal coordinates are valid at the epoch date displayed above.

EL0811.The epoch date for horizontal control is a decimal equivalence

EL0811.of Year/Month/Day.

EL0811

EL0811.The orthometric height was determined by GPS observations and a

EL0811.high-resolution geoid model.

EL0811

EL0811.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL0811

EL0811.The Laplace correction was computed from DEFLEC09 derived deflections.

EL0811

EL0811.The ellipsoidal height was determined by GPS observations

EL0811.and is referenced to NAD 83.

EL0811

EL0811.The geoid height was determined by GEOID09.

EL0811

EL0811; North East Units Scale Factor Converg.

EL0811;SPC OK S - 139,715.755 734,906.176 MT 0.99993594 +0 50 05.0

EL0811;SPC OK S - 458,384.11 2,411,104.68 sFT 0.99993594 +0 50 05.0

EL0811;UTM 14 - 3,829,690.889 726,601.816 MT 1.00023295 +1 24 10.5

EL0811

EL0811! - Elev Factor x Scale Factor = Combined Factor

EL0811!SPC OK S - 0.99996755 x 0.99993594 = 0.99990350

EL0811!UTM 14 - 0.99996755 x 1.00023295 = 1.00020050

EL0811

EL0811:	Primary Azimuth Mark	Grid Az
EL0811:SPC OK S	- JESSE AZ MK	356 53 58.2
EL0811:UTM 14	- JESSE AZ MK	356 19 52.7

EL0811

EL0811	-----		
EL0811	PID Reference Object	Distance	Geod. Az
EL0811		dddmmss.s	
EL0811	CY1320 JESSE RM 1	12.841 METERS	17616
EL0811	CY1321 JESSE RM 2	31.650 METERS	24636
EL0811	CY1319 JESSE AZ MK		3574403.2
EL0811	-----		

EL0811

EL0811

SUPERSEDED SURVEY CONTROL

EL0811

EL0811	ELLIP H (04/16/01)	206.702 (m)	GP( ) 4 2
EL0811	NAD 83(1993)-	34 35 02.56172(N)	096 31 46.02047(W) AD( ) B
EL0811	ELLIP H (05/09/94)	206.760 (m)	GP( ) 4 2
EL0811	NAD 83(1986)-	34 35 02.56517(N)	096 31 46.01217(W) AD( ) 3
EL0811	NAD 27	- 34 35 02.23730(N)	096 31 45.00020(W) AD( ) 3
EL0811	NGVD 29 (07/19/86)	233.17 (m)	765.0 (f) LEVELING 3

EL0811

EL0811.Superseded values are not recommended for survey control.

EL0811.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL0811.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL0811

EL0811\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SQD2660129690(NAD 83)

EL0811\_MARKER: DS = TRIANGULATION STATION DISK

EL0811\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

EL0811\_SP\_SET: SQUARE CONCRETE MONUMENT

EL0811\_STAMPING: JESSE 1955

EL0811\_MARK LOGO: CGS

EL0811\_MAGNETIC: N = NO MAGNETIC MATERIAL

EL0811\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

EL0811+STABILITY: SURFACE MOTION

EL0811\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL0811+SATELLITE: SATELLITE OBSERVATIONS - May 04, 1993

EL0811

EL0811	HISTORY	- Date	Condition	Report By
EL0811	HISTORY	- 1955	MONUMENTED	CGS
EL0811	HISTORY	- 1955	GOOD	CGS
EL0811	HISTORY	- 19930504	GOOD	NGS

EL0811

STATION DESCRIPTION

EL0811

EL0811'DESCRIBED BY COAST AND GEODETIC SURVEY 1955 (RLE)  
 EL0811'THE STATION IS ABOUT 6.5 MILES EAST-SOUTHEAST OF FITTSTOWN,  
 EL0811'ABOUT 5.0 MILES SOUTH OF STONEWALL, 0.1 MILE NORTH OF THE  
 EL0811'JESSE SCHOOL, 43 FEET EAST OF THE CENTER OF STATE HIGHWAY  
 EL0811'61, 8 FEET NORTHWEST OF A T FENCE CORNER, 4 FEET WEST OF  
 EL0811'A FENCE AND 4 FEET WEST OF A WITNESS POST. IT IS STAMPED

EL0811'JESSE 1955 AND IS SET FLUSH.

EL0811'

EL0811'REFERENCE MARK NO. 1 IS 61 FEET NORTH OF POWERLINE POLE

EL0811'118, 45 FEET EAST OF STATE HIGHWAY 61, 31 FEET SOUTH OF A

EL0811'T FENCE CORNER AND 2 FEET WEST OF A FENCE. IT IS STAMPED

EL0811'JESSE NO 1 1955 AND IS SET FLUSH.

EL0811'

EL0811'REFERENCE MARK NO. 2 IS 51 FEET WEST OF THE CENTER OF STATE

EL0811'HIGHWAY 61 AND 1 FOOT SOUTHEAST OF A FENCE CORNER. IT IS

EL0811'STAMPED JESSE NO 2 1955 AND IS SET FLUSH.

EL0811'

EL0811'THE AZIMUTH MARK IS 45 FEET WEST OF THE CENTER OF STATE

EL0811'HIGHWAY 61, 3 FEET EAST OF A FENCE AND 1 FOOT SOUTH OF A

EL0811'WITNESS POST. IT IS STAMPED JESSE 1955 AND PROJECTS 6 INCHES.

EL0811'

EL0811'TO REACH THE AZIMUTH FROM THE STATION GO NORTH 0.55

EL0811'MILE TO THE MARK ON THE LEFT AS DESCRIBED.

EL0811

EL0811                                   STATION RECOVERY (1955)

EL0811

EL0811'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1955

EL0811'RECOVERED IN GOOD CONDITION.

EL0811

EL0811                                   STATION RECOVERY (1993)

EL0811

EL0811'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993

EL0811'THE STATION AND RM 2 WERE RECOVERED IN GOOD CONDITION. RM 1 AND THE

EL0811'AZIMUTH WERE SEARCHED FOR BUT NOT FOUND.

EL0811'THE STATION IS LOCATED ABOUT 40 KM (24.85 MI) EAST-NORTHEAST OF

EL0811'SULPHUR, 26 KM (16.15 MI) SOUTHEAST OF ADA, 8 KM (4.95 MI) SOUTH OF

EL0811'STONEWALL, ON THE NORTH SIDE OF THE TOWN OF JESSE IN GRASS AND BRUSH

EL0811'ON THE WEST SIDE OF A LARGE OPEN PASTURE AND IN THE ROAD

EL0811'RIGHT-OF-WAY. OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.

EL0811'TO REACH FROM THE T-JUNCTION OF U.S. HIGHWAY 377 AND STATE HIGHWAY 99

EL0811'A ON THE SOUTH SIDE OF FITTSTOWN, GO EAST ON HIGHWAY 99 A FOR 3.1 KM

EL0811'(1.90 MI) TO A GRAVEL CROSSROAD IN THE SMALL TOWN OF HARDEN CITY.

EL0811'CONTINUE AHEAD, EAST, ON HIGHWAY 99 A FOR 0.5 KM (0.30 MI) TO A SIGN

EL0811'-99 A END- IN HARDEN CITY. CONTINUE AHEAD, EAST, ON THE PAVED ROAD

EL0811'FOR 6.1 KM (3.80 MI) TO A PAVED T-JUNCTION. TURN RIGHT, SOUTH, ON

EL0811'THE PAVED ROAD FOR 2.6 KM (1.60 MI) TO THE SOUTH ENTRANCE TO THE

EL0811'JESSE CEMETERY ON THE RIGHT AND THE STATION ON THE LEFT.

EL0811'THE STATION IS SET IN THE TOP OF A 30 CM SQUARE CONCRETE POST SET

EL0811'FLUSH WITH THE GROUND. IT IS 13.7 M (44.9 FT) EAST FROM THE CENTER

EL0811'OF THE PAVED ROAD, 4.6 M (15.1 FT) NORTH FROM THE CENTER OF THE

EL0811'GRAVEL ENTRANCE TO A PASTURE, 2.8 M (9.2 FT) NORTHWEST FROM THE NORTH

EL0811'GATE POST OF THE GATE INTO THE PASTURE, AND 1.3 M (4.3 FT) WEST FROM

EL0811'A STEEL WITNESS POST IN A FENCE.

EL0811'DESCRIBED BY D.G. AUG

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL1054 \*\*\*\*\*

EL1054 CBN - This is a Cooperative Base Network Control Station.

**EL1054 DESIGNATION - JOY**

EL1054 PID - EL1054

EL1054 STATE/COUNTY- OK/MURRAY

EL1054 USGS QUAD - JOY (1990)

EL1054

EL1054 \*CURRENT SURVEY CONTROL

EL1054

EL1054\* NAD 83(2007)- 34 34 01.51375(N) 097 08 07.86557(W) ADJUSTED

EL1054\* NAVD 88 - 265.0 (meters) 869. (feet) GPS OBS

EL1054

EL1054 EPOCH DATE - 2002.00

EL1054 X - -653,133.642 (meters) COMP

EL1054 Y - -5,217,299.105 (meters) COMP

EL1054 Z - 3,598,558.690 (meters) COMP

EL1054 LAPLACE CORR- -0.12 (seconds) DEFLEC09

EL1054 ELLIP HEIGHT- 239.659 (meters) (02/10/07) ADJUSTED

EL1054 GEOID HEIGHT- -25.32 (meters) GEOID09

EL1054

EL1054 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL1054 Type PID Designation North East Ellip

EL1054 -----

EL1054 NETWORK EL1054 JOY 1.18 1.02 2.92

EL1054 -----

EL1054

EL1054.The horizontal coordinates were established by GPS observations

EL1054.and adjusted by the National Geodetic Survey in February 2007.

EL1054

EL1054.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL1054.See [National Readjustment](#) for more information.

EL1054.The horizontal coordinates are valid at the epoch date displayed above.

EL1054.The epoch date for horizontal control is a decimal equivalence

EL1054.of Year/Month/Day.

EL1054

EL1054.The orthometric height was determined by GPS observations and a

EL1054.high-resolution geoid model.

EL1054

EL1054.[Photographs](#) are available for this station.

EL1054

EL1054.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL1054

EL1054.The Laplace correction was computed from DEFLEC09 derived deflections.

EL1054

EL1054.The ellipsoidal height was determined by GPS observations

EL1054.and is referenced to NAD 83.

EL1054

EL1054.The geoid height was determined by GEOID09.

EL1054

EL1054; North East Units Scale Factor Converg.



EL1054;SPC OK S - 137,191.670 679,324.289 MT 0.99993599 +0 29 26.5  
EL1054;SPC OK S - 450,103.00 2,228,749.77 sFT 0.99993599 +0 29 26.5  
EL1054;UTM 14 - 3,826,615.667 671,039.089 MT 0.99996059 +1 03 29.2

EL1054

EL1054! - Elev Factor x Scale Factor = Combined Factor

EL1054!SPC OK S - 0.99996238 x 0.99993599 = 0.99989837

EL1054!UTM 14 - 0.99996238 x 0.99996059 = 0.99992297

EL1054

EL1054 SUPERSEDED SURVEY CONTROL

EL1054

EL1054 ELLIP H (04/16/01) 239.673 (m) GP( ) 4 2

EL1054 NAD 83(1993)- 34 34 01.51330(N) 097 08 07.86557(W) AD( ) B

EL1054 ELLIP H (05/09/94) 239.727 (m) GP( ) 4 2

EL1054

EL1054.Superseded values are not recommended for survey control.

EL1054.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL1054.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL1054

EL1054\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPD7103926615(NAD 83)

EL1054\_MARKER: I = METAL ROD

EL1054\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

EL1054\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

EL1054\_STAMPING: JOY 1993

EL1054\_MARK LOGO: NGS

EL1054\_PROJECTION: RECESSED 1 CENTIMETERS

EL1054\_MAGNETIC: N = NO MAGNETIC MATERIAL

EL1054\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

EL1054\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL1054+SATELLITE: SATELLITE OBSERVATIONS - October 25, 2002

EL1054\_ROD/PIPE-DEPTH: 13.4 meters

EL1054\_SLEEVE-DEPTH : 0.9 meters

EL1054

EL1054 HISTORY - Date Condition Report By

EL1054 HISTORY - 1993 MONUMENTED NGS

EL1054 HISTORY - 20021025 GOOD JCLS

EL1054

EL1054 STATION DESCRIPTION

EL1054

EL1054'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

EL1054'STATION IS LOCATED ABOUT 7 KM (4.35 MI) NORTH OF DAVIS, 3 KM

EL1054'(1.85 MI) SOUTH-SOUTHEAST OF JOY, ALONG US HIGHWAY 77, ON THE

EL1054'RIGHT-OF-WAY, ON THE OUTSIDE OF A GENTLE CURVE, AT THE TOP OF A RISE,

EL1054'ADJACENT TO A PASTURE, IN THE SOUTHWEST 1/4 OF SECTION 7, T 1 N, R 2

EL1054'E. OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.

EL1054'TO REACH FROM THE OVERPASS AT THE JUNCTION OF INTERSTATE HIGHWAY 35

EL1054'AND STATE HIGHWAY 7 (EXIT 55), ABOUT 4 KM (2.50 MI) WEST OF DAVIS, GO

EL1054'EAST ON HIGHWAY 7 FOR 4.44 KM (2.75 MI) TO ITS JUNCTION WITH US

EL1054'HIGHWAY 77 SOUTH ON THE RIGHT. CONTINUE AHEAD ON HIGHWAYS 7 AND 77

EL1054'FOR 0.69 KM (0.40 MI) TO HIGHWAY 77 NORTH ON THE LEFT. TURN LEFT,

EL1054'NORTH, ON HIGHWAY 77 FOR 7.30 KM (4.55 MI) TO A NARROW PAVED

EL1054'CROSSROAD. CONTINUE AHEAD FOR 0.29 KM (0.20 MI) TO THE STATION ON

EL1054'THE RIGHT AT TOP OF RISE.

EL1054'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN A

EL1054'GREASE FILLED SLEEVE 90 CM LONG ENCASED IN A 12.7 CM PVC PIPE WITH

EL1054'LOGO CAP SURROUNDED BY CONCRETE SET 1 CM BELOW GROUND. IT IS 19.1 M

EL1054'(62.7 FT) EAST OF, AND 0.5 M (1.6 FT) HIGHER THAN THE HIGHWAY CENTER,

EL1054'1.1 M (3.6 FT) WEST OF A FIBERGLASS WITNESS POST IN THE PASTURE  
EL1054'FENCE, 1.1 M (3.6 FT) SOUTH OF A METAL WITNESS POST, 1.2 M (3.9 FT)  
EL1054'NORTH OF A METAL WITNESS POST, 26.9 M (88.3 FT) SOUTH OF A PIPE FENCE  
EL1054'POST, 16.2 M (53.1 FT) NORTH OF A PIPE FENCE POST, AND 37.5 M  
EL1054'(123.0 FT) EAST OF A UTILITY POLE ACROSS THE HIGHWAY.

EL1054

EL1054 STATION RECOVERY (2002)

EL1054

EL1054'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2002 (MRY)

EL1054'RECOVERED IN GOOD CONDITION.

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DRAFT

## The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL0823 \*\*\*\*\*

EL0823 CBN - This is a Cooperative Base Network Control Station.

**EL0823 DESIGNATION - MAXWELL**

EL0823 PID - EL0823

EL0823 STATE/COUNTY- OK/PONTOTOC

EL0823 USGS QUAD - KONAWA (1979)

EL0823

EL0823 \*CURRENT SURVEY CONTROL

EL0823

EL0823\* NAD 83(2007)- 34 53 00.76418(N) 096 52 28.01481(W) ADJUSTED

EL0823\* NAVD 88 - 327.3 (meters) 1074. (feet) GPS OBS

EL0823

EL0823 EPOCH DATE - 2002.00

EL0823 X - -626,966.482 (meters) COMP

EL0823 Y - -5,200,415.943 (meters) COMP

EL0823 Z - 3,627,448.685 (meters) COMP

EL0823 LAPLACE CORR- -2.44 (seconds) DEFLEC09

EL0823 ELLIP HEIGHT- 301.177 (meters) (02/10/07) ADJUSTED

EL0823 GEOID HEIGHT- -26.12 (meters) GEOID09

EL0823

EL0823 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL0823 Type PID Designation North East Ellip

EL0823 -----

EL0823 NETWORK EL0823 MAXWELL 1.51 1.33 3.74

EL0823 -----

EL0823

EL0823.The horizontal coordinates were established by GPS observations

EL0823.and adjusted by the National Geodetic Survey in February 2007.

EL0823

EL0823.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL0823.See [National Readjustment](#) for more information.

EL0823.The horizontal coordinates are valid at the epoch date displayed above.

EL0823.The epoch date for horizontal control is a decimal equivalence

EL0823.of Year/Month/Day.

EL0823

EL0823.The orthometric height was determined by GPS observations and a

EL0823.high-resolution geoid model.

EL0823

EL0823.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL0823

EL0823.The Laplace correction was computed from DEFLEC09 derived deflections.

EL0823

EL0823.The ellipsoidal height was determined by GPS observations

EL0823.and is referenced to NAD 83.

EL0823

EL0823.The geoid height was determined by GEOID09.

EL0823

EL0823; North East Units Scale Factor Converg.

EL0823;SPC OK S - 172,530.023 702,887.567 MT 0.99994954 +0 38 20.0

EL0823;SPC OK S - 566,042.25 2,306,056.96 sFT 0.99994954 +0 38 20.0

EL0823:UTM 14 - 3,862,190.066 694,250.020 MT 1.00006508 +1 12 57.6

EL0823

EL0823! - Elev Factor x Scale Factor = Combined Factor

EL0823:SPC OK S - 0.99995273 x 0.99994954 = 0.99990227

EL0823:UTM 14 - 0.99995273 x 1.00006508 = 1.00001780

EL0823

EL0823: Primary Azimuth Mark Grid Az

EL0823:SPC OK S - MAXWELL AZ MK 268 02 23.8

EL0823:UTM 14 - MAXWELL AZ MK 267 27 46.2

EL0823

EL0823|-----|

EL0823|PID Reference Object Distance Geod. Az |

EL0823| dddmmss.s |

EL0823|CY1593 MAXWELL RM 1 31.114 METERS 19702 |

EL0823|CY1592 MAXWELL AZ MK 2684043.8 |

EL0823|CY1594 MAXWELL RM 2 22.118 METERS 29637 |

EL0823|EL0834 ASHER MUNICIPAL TANK APPROX.12.6 KM 3392051.7 |

EL0823|-----|

EL0823

EL0823 SUPERSEDED SURVEY CONTROL

EL0823

EL0823 ELLIP H (04/16/01) 301.187 (m) GP( ) 4 2

EL0823 NAD 83(1993)- 34 53 00.76384(N) 096 52 28.01473(W) AD( ) B

EL0823 ELLIP H (05/09/94) 301.241 (m) GP( ) 4 2

EL0823 NAD 83(1986)- 34 53 00.76807(N) 096 52 28.00039(W) AD( ) 3

EL0823 NAD 27 - 34 53 00.48079(N) 096 52 26.93675(W) AD( ) 3

EL0823 NGVD 29 (07/19/86) 327.19 (m) 1073.5 (f) LEVELING 3

EL0823

EL0823.Superseded values are not recommended for survey control.

EL0823.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL0823.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL0823

EL0823\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPD9425062190(NAD 83)

EL0823\_MARKER: DS = TRIANGULATION STATION DISK

EL0823\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

EL0823\_SP\_SET: SQUARE CONCRETE MONUMENT

EL0823\_STAMPING: MAXWELL 1957

EL0823\_MARK LOGO: CGS

EL0823\_MAGNETIC: N = NO MAGNETIC MATERIAL

EL0823\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

EL0823+STABILITY: SURFACE MOTION

EL0823\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL0823+SATELLITE: SATELLITE OBSERVATIONS - May 04, 1993

EL0823

EL0823 HISTORY - Date Condition Report By

EL0823 HISTORY - 1957 MONUMENTED CGS

EL0823 HISTORY - 1957 GOOD CGS

EL0823 HISTORY - 19930504 GOOD NGS

EL0823

EL0823 STATION DESCRIPTION

EL0823

EL0823'DESCRIBED BY COAST AND GEODETIC SURVEY 1957 (OSR)

EL0823'STATION IS LOCATED ABOUT 9 MILES SOUTHWEST OF KONAWA, 8 MILES

EL0823'SOUTHEAST OF ASHER, AT THE JUNCTION OF STATE HIGHWAYS 13 AND 59A,

EL0823'IN SECTION 22, T. 5. N. R. 4. E.

EL0823'

EL0823'REACHED FROM THE JUNCTION OF STATE HIGHWAYS 39 AND 18 IN THE SOUTH  
EL0823'EDGE OF ASHER, GO SOUTH ON STATE HIGHWAY 18 FOR 2.5 MILES TO THE  
EL0823'JUNCTION OF STATE HIGHWAY 13 ON THE LEFT, KEEP LEFT AND GO 6.3  
EL0823'MILES TO THE JUNCTION OF STATE HIGHWAY 59A ON THE RIGHT AND THE  
EL0823'STATION.

EL0823'

EL0823'TO REACHED THE AZIMUTH MARK FROM THE STATION GO WESTERLY ON STATE  
EL0823'HIGHWAY 59A FOR 0.4 MILES TO THE MARK ON THE LEFT.

EL0823'

EL0823'STATION MARKS ARE STANDARD DISKS, STAMPED MAXWELL 1957. THE SURFACE  
EL0823'MARK IS SET IN THE TOP OF A 10 INCH, SQUARE, CONCRETE POST WHICH  
EL0823'PROJECTS 6 INCHES. IT IS 300 FEET WEST OF THE CENTER OF THE  
EL0823'JUNCTION OF STATE HIGHWAYS 13 AND 59A, 80 FEET SOUTH OF THE CENTER  
EL0823'OF STATE HIGHWAY 13, 71 FEET NORTH OF THE CENTER OF STATE HIGHWAY  
EL0823'59A, AND 35 FEET SOUTHEAST OF A POWERLINE POLE. A 4 IN X 4 IN  
EL0823'WHITE WITNESS POST WAS SET 1 FOOT NORTH OF THE MARK. THE  
EL0823'UNDERGROUND MARK IS SET IN AN IRREGULAR MASS OF CONCRETE 34 INCHES  
EL0823'BELOW THE GROUND SURFACE.

EL0823'

EL0823'REFERENCE MARK 1 IS A STANDARD DISK, STAMPED MAXWELL NO 1 1957,  
EL0823'SET IN THE TOP OF A 10 INCH, SQUARE, CONCRETE POST WHICH PROJECTS  
EL0823'4 INCHES. IT IS 49 FEET SOUTH OF THE CENTER OF STATE HIGHWAY 59A  
EL0823'AND 1 FOOT NORTH OF A RIGHT-OF-WAY FENCE.

EL0823'

EL0823'REFERENCE MARK 2 IS A STANDARD DISK, STAMPED MAXWELL NO 2 1957,  
EL0823'SET IN THE TOP OF A 10 INCH, SQUARE, CONCRETE POST WHICH PROJECTS  
EL0823'5 INCHES. IT IS 79 FEET SOUTH OF THE CENTER OF STATE HIGHWAY 13  
EL0823'AND 73 FEET NORTH OF THE CENTER OF STATE HIGHWAY 59A.

EL0823'

EL0823'AZIMUTH MARK IS A STANDARD DISK, STAMPED MAXWELL 1957, SET IN THE  
EL0823'TOP OF A 10 INCH, SQUARE, CONCRETE POST WHICH PROJECTS 6 INCHES.

EL0823'IT IS 145 FEET NORTHEAST OF THE NORTHEAST CORNER OF A FARM  
EL0823'HOUSE, 52 FEET SOUTH OF THE CENTER OF STATE HIGHWAY 59A,  
EL0823'AND 1 FOOT NORTH OF A RIGHT-OF-WAY FENCE. A 4 IN X 4 IN WHITE  
EL0823'WITNESS POST WAS SET 2 FEET WEST OF THE MARK.

EL0823'

EL0823'HEIGHT OF LIGHT ABOVE STATION MARK 23 METERS.

EL0823

STATION RECOVERY (1957)

EL0823

EL0823'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1957

EL0823'RECOVERED IN GOOD CONDITION.

EL0823

EL0823 STATION RECOVERY (1993)

EL0823

EL0823'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993

EL0823'THE STATION, RM 1 AND RM 2 WERE RECOVERED IN GOOD CONDITION. THE  
EL0823'AZIMUTH MARK WAS SEARCHED FOR BUT NOT FOUND.

EL0823'THE STATION IS LOCATED ABOUT 33 KM (20.50 MI) NORTHEAST OF PAULS  
EL0823'VALLEY, 19 KM (11.80 MI) NORTHWEST OF ADA, IN GRASS NEAR THE  
EL0823'SOUTHEAST END OF A TRIANGULAR SHAPED PARCEL OF LAND CREATED BY THE  
EL0823'JUNCTION OF HIGHWAYS 59 A AND 3 W AND IN THE HIGHWAY RIGHT-OF-WAY.

EL0823'OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.

EL0823'THE STATION IS SET IN THE TOP OF A 25 CM SQUARE CONCRETE POST  
EL0823'PROJECTING 20 CM. IT IS 24.0 M (78.7 FT) SOUTHWEST FROM THE CENTER  
EL0823'OF, AND ABOUT 1 M (3.3 FT) HIGHER THAN HIGHWAY 3 W, 15.9 M (52.2 FT)

EL0823'NORTH FROM THE CENTER OF, AND SLIGHTLY LOWER THAN HIGHWAY 59 A, 9.6 M  
EL0823'(31.5 FT) SOUTHWEST FROM A POWER POLE, 0.8 M (2.6 FT) SOUTHEAST FROM  
EL0823'A FIBERGLASS WITNESS POST, AND 0.8 M (2.6 FT) NORTHWEST FROM A  
EL0823'FIBERGLASS POST.  
EL0823'DESCRIBED BY D.G. AUG

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FJ0789 \*\*\*\*\*

**FJ0789 DESIGNATION - POCASSET**

FJ0789 PID - FJ0789

FJ0789 STATE/COUNTY- OK/GRADY

FJ0789 USGS QUAD - POCASSET (1975)

FJ0789

FJ0789 \*CURRENT SURVEY CONTROL

FJ0789

FJ0789\* NAD 83(1993)- 35 07 39.53148(N) 097 57 41.48384(W) ADJUSTED

FJ0789\* NAVD 88 - 361.596 (meters) 1186.34 (feet) ADJUSTED

FJ0789

FJ0789 LAPLACE CORR- 1.32 (seconds) DEFLECO9

FJ0789 GEOID HEIGHT- -26.68 (meters) GEOID09

FJ0789 DYNAMIC HT - 361.237 (meters) 1185.16 (feet) COMP

FJ0789 MODELED GRAV- 979,631.0 (mgal) NAVD 88

FJ0789

FJ0789 HORZ ORDER - SECOND

FJ0789 VERT ORDER - FIRST CLASS II

FJ0789

FJ0789.The horizontal coordinates were established by classical geodetic methods

FJ0789.and adjusted by the National Geodetic Survey in November 1994.

FJ0789

FJ0789.The orthometric height was determined by differential leveling and

FJ0789.adjusted in June 1991.

FJ0789

FJ0789.The Laplace correction was computed from DEFLECO9 derived deflections.

FJ0789

FJ0789.The geoid height was determined by GEOID09.

FJ0789

FJ0789.The dynamic height is computed by dividing the NAVD 88

FJ0789.geopotential number by the normal gravity value computed on the

FJ0789.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FJ0789.degrees latitude (g = 980.6199 gals.).

FJ0789

FJ0789.The modeled gravity was interpolated from observed gravity values.

FJ0789

FJ0789; North East Units Scale Factor Converg.

FJ0789;SPC OK S - 199,036.917 603,506.938 MT 0.99998082 +0 01 18.6

FJ0789;SPC OK S - 653,006.95 1,980,005.68 sFT 0.99998082 +0 01 18.6

FJ0789;UTM 14 - 3,887,692.265 594,617.086 MT 0.99971033 +0 35 51.3

FJ0789

FJ0789! - Elev Factor x Scale Factor = Combined Factor

FJ0789!SPC OK S - 0.99994743 x 0.99998082 = 0.99992825

FJ0789!UTM 14 - 0.99994743 x 0.99971033 = 0.99965778

FJ0789

FJ0789: Primary Azimuth Mark Grid Az

FJ0789:SPC OK S - POCASSET AZ MK 002 57 16.8

FJ0789:UTM 14 - POCASSET AZ MK 002 22 44.1

FJ0789

FJ0789|-----|

FJ0789	PID	Reference Object	Distance	Geod. Az
FJ0789			dddmms.s	
FJ0789	FJ0790	POCASSET AZ MK		0025835.4
FJ0789	CL6009	POCASSET RM 3	52.937 METERS	03345
FJ0789	FJ1054	AMBER MOORE STAUFFER ELEV	APPROX. 8.3 KM	0635003.2
FJ0789	CL6007	POCASSET RM 1	29.601 METERS	09555
FJ0789	FJ1043	CHICKASHA TRADERS TANK	APPROX. 8.7 KM	1614457.9
FJ0789	FJ1048	CHICKASHA RAD STA KWCO S MAST	APPROX. 11.1 KM	1680414.8
FJ0789	CL6008	POCASSET RM 2	10.225 METERS	35738

FJ0789|-----|  
 FJ0789  
 FJ0789                   SUPERSEDED SURVEY CONTROL  
 FJ0789

FJ0789 NAD 83(1986)- 35 07 39.53744(N) 097 57 41.46760(W) AD( ) 2  
 FJ0789 NAD 27 - 35 07 39.31318(N) 097 57 40.30424(W) AD( ) 2  
 FJ0789

FJ0789.Superseded values are not recommended for survey control.  
 FJ0789.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.  
 FJ0789.[See file dsdata.txt](#) to determine how the superseded data were derived.

FJ0789  
 FJ0789\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SND9461787692(NAD 83)  
 FJ0789\_MARKER: DS = TRIANGULATION STATION DISK  
 FJ0789\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT  
 FJ0789\_SP\_SET: CONCRETE POST  
 FJ0789\_STAMPING: POCASSET 1957  
 FJ0789\_MARK LOGO: CGS  
 FJ0789\_PROJECTION: RECESSED 20 CENTIMETERS  
 FJ0789\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO  
 FJ0789+STABILITY: SURFACE MOTION  
 FJ0789\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
 FJ0789+SATELLITE: SATELLITE OBSERVATIONS - April 01, 2008

FJ0789

FJ0789	HISTORY	- Date	Condition	Report By
FJ0789	HISTORY	- 1957	MONUMENTED	CGS
FJ0789	HISTORY	- 1977	GOOD	NGS
FJ0789	HISTORY	- 1977	GOOD	NGS
FJ0789	HISTORY	- 1986	GOOD	NGS
FJ0789	HISTORY	- 20080401	GOOD	AIRDAT

FJ0789  
 FJ0789                   STATION DESCRIPTION  
 FJ0789  
 FJ0789'DESCRIBED BY COAST AND GEODETIC SURVEY 1957 (OSR)  
 FJ0789'STATION IS ABOUT 7 MILES NORTH OF CHICKASHA, 5 MILES SOUTH  
 FJ0789'OF POCASSET, IN THE NORTHWEST 1/4 OF SECTION 32, T 8 N, R 7 W,  
 FJ0789'ON THE HIGHEST POINT IN THE IMMEDIATE VICINITY, AND AT THE  
 FJ0789'EAST EDGE OF A CULTIVATED FIELD.  
 FJ0789'  
 FJ0789'REACHED FROM THE POST OFFICE IN POCASSET BY GOING SOUTH ON  
 FJ0789'STATE HIGHWAY 81 FOR 4.45 MILE TO THE AZIMUTH MARK ON THE  
 FJ0789'LEFT, CONTINUE SOUTH FOR 0.1 MILE TO A CROSSROADS, CONTINUE  
 FJ0789'SOUTH FOR 0.2 MILE TO THE TOP OF A GRADE AND THE STATION ON  
 FJ0789'THE RIGHT.  
 FJ0789'  
 FJ0789'STATION MARKS ARE STANDARD DISKS, STAMPED POCASSET 1957.  
 FJ0789'THE SURFACE MARK IS SET IN A 10-INCH SQUARE CONCRETE POST  
 FJ0789'FLUSH WITH THE GROUND SURFACE. IT IS 47 FEET WEST OF THE



FJ0789'CENTER OF THE HIGHWAY, 5 FEET EAST OF A NORTH-SOUTH RIGHT-OF-WAY  
FJ0789'FENCE AND ABOUT 3 FEET ABOVE THE HIGHWAY LEVEL. A WHITE  
FJ0789'WITNESS POST WAS SET 3 FEET SOUTHWEST OF THE MARK. THE  
FJ0789'UNDERGROUND MARK IS SET IN AN IRREGULAR MASS OF CONCRETE 32  
FJ0789'INCHES BELOW THE GROUND SURFACE.

FJ0789'

FJ0789'REFERENCE MARK 1 IS 50 FEET EAST OF THE CENTER OF THE HIGHWAY  
FJ0789'AND 1 FOOT WEST OF A NORTH-SOUTH RIGHT-OF-WAY FENCE. IT IS  
FJ0789'A STANDARD DISK SET IN A 10-INCH SQUARE CONCRETE POST PROJECTING  
FJ0789'6 INCHES AND THE DISK IS STAMPED POCASSET NO 1 1957.

FJ0789'

FJ0789'REFERENCE MARK 2 IS A STANDARD DISK, STAMPED POCASSET NO 2  
FJ0789'1957, SET IN A 10-INCH SQUARE CONCRETE POST PROJECTING 6 INCHES.  
FJ0789'IT IS 48 FEET WEST OF THE CENTER OF THE HIGHWAY AND 2 FEET EAST  
FJ0789'OF THE RIGHT-OF-WAY FENCE.

FJ0789'

FJ0789'AZIMUTH MARK IS 50 FEET EAST OF THE CENTER OF THE HIGHWAY,  
FJ0789'25 FEET SOUTH OF A T-JUNCTION OF FENCE LINES AND 1 FOOT WEST  
FJ0789'OF A RIGHT-OF-WAY FENCE. THE MARK IS A STANDARD DISK, STAMPED  
FJ0789'POCASSET 1957, SET IN A 10-INCH SQUARE CONCRETE POST PROJECTING  
FJ0789'4 INCHES. A WHITE WITNESS POST WAS SET 1 FOOT NORTH OF THE  
FJ0789'MARK.

FJ0789

FJ0789 STATION RECOVERY (1977)

FJ0789

FJ0789'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1977 (PDC)  
FJ0789'THE STATION MARK, REFERENCE MARKS 1 AND 3 WERE RECOVERED AS  
FJ0789'DESCRIBED AND IN GOOD CONDITION. THE AZIMUTH MARK WAS RECOVERED  
FJ0789'AS DESCRIBED IN GOOD CONDITION.

FJ0789'

FJ0789'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--7 MILES NORTH OF  
FJ0789'CHICKASHA.

FJ0789

FJ0789 STATION RECOVERY (1977)

FJ0789

FJ0789'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1977 (CLN)  
FJ0789'THE STATION MARK, REFERENCE MARK NO.1 AND THE AZIMUTH MARK WERE  
FJ0789'RECOVERED AND FOUND IN GOOD CONDITION. REFERENCE MARK NO.2 WAS  
FJ0789'NOT RECOVERED AND IS BELIEVED TO HAVE BEEN DESTROYED.

FJ0789'

FJ0789'REFERENCE MARK NO.3 WAS ESTABLISHED AT THIS TIME.

FJ0789'

FJ0789'A DIFFERENCE WAS FOUND IN THE DISTANCE TO REFERENCE MARK NO.1.

FJ0789'

FJ0789'A NEW AND COMPLETE DESCRIPTION FOLLOWS--

FJ0789'

FJ0789'THE STATION IS LOCATED ABOUT 5 MILES SOUTH OF POCASSET, 5 MILES  
FJ0789'NORTH OF CHICHASHA, AND ON THE WEST RIGHT-OF-WAY OF U.S. HIGHWAY  
FJ0789'81.

FJ0789'

FJ0789'TO REACH THE STATION FROM THE POST OFFICE IN POCASSET, GO SOUTH  
FJ0789'ON U.S. HIGHWAY 81 FOR 4.5 MILES TO THE AZIMUTH MARK ON THE LEFT  
FJ0789'AND GATE ON THE LEFT. CONTINUE SOUTH ON HIGHWAY FOR 0.35 MILE TO  
FJ0789'THE STATION ON THE RIGHT.

FJ0789'

FJ0789'STATION IS A STANDARD DISK, SET IN TOP OF A CONCRETE POST, THAT IS

FJ0789'ABOUT 12-INCHES BELOW THE SURFACE OF THE GROUND AND IS STAMPED FJ0789'POCASSET 1957. IT IS 47 FEET WEST OF THE CENTER LINE OF HIGHWAY FJ0789'81, 4 FEET SOUTH OF A WITNESS POST AND 1-FOOT EAST OF A METAL FJ0789'WITNESS POST.

FJ0789'

FJ0789'REFERENCE MARK NO.1 IS A STANDARD DISK, SET IN THE TOP OF A CONCRETE FJ0789'POST, THAT PROJECTS 4-INCHES AND IS STAMPED POCASSET NO 1 1957. IT FJ0789'IS 49 FEET EAST OF THE CENTER LINE OF HIGHWAY, 12.6 FEET NORTH OF FJ0789'THE NORTH END OF A DOUBLE BRACED FENCE POST AND 1-FOOT WEST OF THE FJ0789'FENCE.

FJ0789'

FJ0789'REFERENCE MARK NO.3 IS A CAST ALUMINUM MONUMENT, THAT PROJECTS FJ0789'ABOUT 5-INCHES AND THE ALUMINUM CAP IS STAMPED POCASSET 1957 NO 3 FJ0789'1977. IT IS 50 FEET EAST OF THE CENTER LINE OF HIGHWAY, AND 1-FOOT FJ0789'WEST OF A METAL WITNESS POST AND FENCE LINE.

FJ0789'

FJ0789'AZIMUTH MARK IS A STANDARD DISK, SET IN THE TOP OF A SQUARE CONCRETE FJ0789'POST, THAT IS FLUSH WITH THE GROUND AND IS STAMPED POCASSET 1957. FJ0789'IT IS 50 FEET EAST OF THE CENTER LINE OF HIGHWAY, 11 FEET SOUTH OF FJ0789'THE CENTER OF FIELD ROAD, 2.6 FEET SOUTH OF THE SOUTH END OF GATE, FJ0789'2.6 FEET NORTH OF A WITNESS POST AND 1-FOOT WEST OF THE FENCE FJ0789'LINE.

FJ0789'

FJ0789'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--POCASSET 5-MILES FJ0789'S.

FJ0789

FJ0789 STATION RECOVERY (1986)

FJ0789

FJ0789'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1986

FJ0789'10.3 KM (6.4 MI) NORTH FROM CHICKASHA.

FJ0789'10.3 KM (6.4 MI) NORTHERLY ALONG U.S. HIGHWAY 81 FROM THE FEDERAL FJ0789'BUILDING IN CHICKASHA, 0.4 KM (0.25 MI) SOUTH OF THE INTERSECTION OF A FJ0789'GRAVELED ROAD LEADING WEST, 14.4 M (47.2 FT) WEST OF THE CENTERLINE OF FJ0789'THE HIGHWAY, AND 1.5 M (4.9 FT) SOUTH OF A HIGHWAY RIGHT-OF-WAY POST. FJ0789'THE MARK IS 0.3 METERS E FROM A WITNESS POST FJ0789'THE MARK IS 0.6 M ABOVE THE HIGHWAY.

FJ0789

FJ0789 STATION RECOVERY (2008)

FJ0789

FJ0789'RECOVERY NOTE BY AERIAL DATA SERVICE INCORPORATED 2008 (KEG)

FJ0789'RECOVERED AS DESCRIBED

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The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

AC9183 \*\*\*\*\*

**AC9183 DESIGNATION - PRCO B**

AC9183 PID - AC9183

AC9183 STATE/COUNTY- OK/MCCLAIN

AC9183 USGS QUAD - CRINER (1980)

AC9183

AC9183 \*CURRENT SURVEY CONTROL

AC9183

AC9183\* NAD 83(2007)- 34 59 08.28741(N) 097 31 22.54348(W) ADJUSTED

AC9183\* NAVD 88 - 352.490 (meters) 1156.46 (feet) ADJUSTED

AC9183

AC9183 EPOCH DATE - 2002.00

AC9183 X - -684,937.518 (meters) COMP

AC9183 Y - -5,186,577.308 (meters) COMP

AC9183 Z - 3,636,748.508 (meters) COMP

AC9183 LAPLACE CORR- 0.43 (seconds) DEFLEC09

AC9183 ELLIP HEIGHT- 326.363 (meters) (02/10/07) ADJUSTED

AC9183 GEOID HEIGHT- -26.11 (meters) GEOID09

AC9183 DYNAMIC HT - 352.144 (meters) 1155.33 (feet) COMP

AC9183

AC9183 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

AC9183 Type PID Designation North East Ellip

AC9183 -----

AC9183 NETWORK AC9183 PRCO B 0.61 0.37 1.80

AC9183 -----

AC9183 MODELED GRAV- 979,641.7 (mgal) NAVD 88

AC9183

AC9183 VERT ORDER - SECOND CLASS I

AC9183

AC9183.This is a reference station for the PURCELL

AC9183.National Continuously Operating Reference Station (PRCO).

AC9183

AC9183.The horizontal coordinates were established by GPS observations

AC9183.and adjusted by the National Geodetic Survey in February 2007.

AC9183

AC9183.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AC9183.See [National Readjustment](#) for more information.

AC9183.The horizontal coordinates are valid at the epoch date displayed above.

AC9183.The epoch date for horizontal control is a decimal equivalence

AC9183.of Year/Month/Day.

AC9183

AC9183.The orthometric height was determined by differential leveling and

AC9183.adjusted in July 2002.

AC9183

AC9183.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AC9183

AC9183.The Laplace correction was computed from DEFLEC09 derived deflections.

AC9183

AC9183.The ellipsoidal height was determined by GPS observations

AC9183.and is referenced to NAD 83.

AC9183

AC9183.The geoid height was determined by GEOID09.

AC9183

AC9183.The dynamic height is computed by dividing the NAVD 88

AC9183.geopotential number by the normal gravity value computed on the

AC9183.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

AC9183.degrees latitude (g = 980.6199 gals.).

AC9183

AC9183.The modeled gravity was interpolated from observed gravity values.

AC9183

AC9183; North East Units Scale Factor Converg.

AC9183;SPC OK S - 183,384.582 643,556.685 MT 0.99996042 +0 16 14.9

AC9183;SPC OK S - 601,654.25 2,111,402.22 sFT 0.99996042 +0 16 14.9

AC9183;UTM 14 - 3,872,446.583 634,813.905 MT 0.99982400 +0 50 49.3

AC9183

AC9183! - Elev Factor x Scale Factor = Combined Factor

AC9183!SPC OK S - 0.99994877 x 0.99996042 = 0.99990920

AC9183!UTM 14 - 0.99994877 x 0.99982400 = 0.99977278

AC9183

AC9183 SUPERSEDED SURVEY CONTROL

AC9183

AC9183 ELLIP H (02/05/01) 326.363 (m) GP( ) 2 2

AC9183 NAD 83(1993)- 34 59 08.28731(N) 097 31 22.54395(W) AD( ) B

AC9183 ELLIP H (10/23/97) 326.377 (m) GP( ) 4 2

AC9183

AC9183.Superseded values are not recommended for survey control.

AC9183.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AC9183.[See file dsdata.txt](#) to determine how the superseded data were derived.

AC9183

AC9183\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPD3481372446(NAD 83)

AC9183\_MARKER: I = METAL ROD

AC9183\_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL

AC9183+WITH SETTING: INFORMATION.

AC9183\_STAMPING: PRCO B 1997

AC9183\_MARK LOGO: NGS

AC9183\_PROJECTION: FLUSH

AC9183\_MAGNETIC: I = MARKER IS A STEEL ROD

AC9183\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

AC9183\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AC9183+SATELLITE: SATELLITE OBSERVATIONS - May 09, 1997

AC9183\_ROD/PIPE-DEPTH: 0.9 meters

AC9183

AC9183 HISTORY - Date Condition Report By

AC9183 HISTORY - 1997 MONUMENTED NGS

AC9183 HISTORY - 19970509 GOOD NGS

AC9183

AC9183 STATION DESCRIPTION

AC9183

AC9183'DESCRIBED BY NATIONAL GEODETIC SURVEY 1997 (GAS)

AC9183'14.4 KM (8.95 MI) WESTERLY ALONG STATE HIGHWAY 39 FROM THE JUNCTION OF

AC9183'INTERSTATE HIGHWAY 35 IN PURCELL, THENCE 3.5 KM (2.15 MI) SOUTHERLY

AC9183'ALONG A GRAVELED ROAD, 55.5 M (182.1 FT) SOUTH OF THE ROAD CENTER,

AC9183'27.3 M (89.6 FT) SOUTH OF THE SOUTHEAST CORNER OF A CATTLE GUARD, 11.9

AC9183'M (39.0 FT) EAST OF THE CENTER OF A DRIVEWAY, AND 0.5 M (1.6 FT) WEST

AC9183'OF A WITNESS POST AND FENCE. NOTE--ACCESS TO THE DATUM POINT IS

AC9183'THROUGH A 5-INCH LOGO CAP. THE SLEEVE DEPTH OF 0.7 METER NOT MEET THE

AC9183'SPECIFICATIONS FOR A CLASS A MARK. THE ROD WAS DRIVEN TO REFUSAL AND  
AC9183'ANCHORED.

AC9183

AC9183 STATION RECOVERY (1997)

AC9183

AC9183'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1997 (ALG)

AC9183'STATION WAS RECOVERED USING THE ORIGINAL DESCRIPTION.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

DN0965 \*\*\*\*\*

DN0965 FBN - This is a Federal Base Network Control Station.

**DN0965 DESIGNATION - T 212**

DN0965 PID - DN0965

DN0965 STATE/COUNTY- OK/BRYAN

DN0965 USGS QUAD - DURANT SOUTH (1980)

DN0965

DN0965 \*CURRENT SURVEY CONTROL

DN0965

DN0965\* NAD 83(2007)- 33 53 37.69842(N) 096 28 45.03193(W) ADJUSTED

DN0965\* NAVD 88 - 213.998 (meters) 702.09 (feet) ADJUSTED

DN0965

DN0965 EPOCH DATE - 2002.00

DN0965 X - -598,062.137 (meters) COMP

DN0965 Y - -5,266,140.403 (meters) COMP

DN0965 Z - 3,536,779.542 (meters) COMP

DN0965 LAPLACE CORR- -1.14 (seconds) DEFLEC09

DN0965 ELLIP HEIGHT- 187.481 (meters) (02/10/07) ADJUSTED

DN0965 GEOID HEIGHT- -26.51 (meters) GEOID09

DN0965 DYNAMIC HT - 213.771 (meters) 701.35 (feet) COMP

DN0965

DN0965 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

DN0965 Type PID Designation North East Ellip

DN0965 -----

DN0965 NETWORK DN0965 T 212 0.45 0.39 1.12

DN0965 -----

DN0965 MODELED GRAV- 979,573.6 (mgal) NAVD 88

DN0965

DN0965 VERT ORDER - FIRST CLASS II

DN0965

DN0965.The horizontal coordinates were established by GPS observations

DN0965.and adjusted by the National Geodetic Survey in February 2007.

DN0965

DN0965.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

DN0965.See [National Readjustment](#) for more information.

DN0965.The horizontal coordinates are valid at the epoch date displayed above.

DN0965.The epoch date for horizontal control is a decimal equivalence

DN0965.of Year/Month/Day.

DN0965

DN0965.The orthometric height was determined by differential leveling and

DN0965.adjusted in June 1991.

DN0965

DN0965.The X, Y, and Z were computed from the position and the ellipsoidal ht.

DN0965

DN0965.The Laplace correction was computed from DEFLEC09 derived deflections.

DN0965

DN0965.The ellipsoidal height was determined by GPS observations

DN0965.and is referenced to NAD 83.

DN0965

DN0965.The geoid height was determined by GEOID09.

DN0965

DN0965.The dynamic height is computed by dividing the NAVD 88  
 DN0965.geopotential number by the normal gravity value computed on the  
 DN0965.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
 DN0965.degrees latitude ( $g = 980.6199$  gals.).

DN0965

DN0965.The modeled gravity was interpolated from observed gravity values.

DN0965

DN0965;	North	East	Units	Scale Factor	Converg.
DN0965;SPC OK S	- 63,229.807	740,671.445	MT	1.00000801	+0 51 47.7
DN0965;SPC OK S	- 207,446.46	2,430,019.57	sFT	1.00000801	+0 51 47.7
DN0965;UTM 14	- 3,753,242.192	733,110.620	MT	1.00026994	+1 24 23.0

DN0965

DN0965! - Elev Factor x Scale Factor = Combined Factor  
 DN0965!SPC OK S -  $0.99997057 \times 1.00000801 = 0.99997858$   
 DN0965!UTM 14 -  $0.99997057 \times 1.00026994 = 1.00024050$

DN0965

DN0965 SUPERSEDED SURVEY CONTROL

DN0965

DN0965 ELLIP H (06/09/00)	187.487 (m)	GP( ) 2 2
DN0965 NAD 83(1993)-	33 53 37.69822(N)	096 28 45.03206(W) AD( ) B
DN0965 ELLIP H (05/09/94)	187.536 (m)	GP( ) 4 2
DN0965 NAVD 88 (05/09/94)	214.00 (m)	702.1 (f) LEVELING 3

DN0965

DN0965.Superseded values are not recommended for survey control.

DN0965.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

DN0965.[See file dsdata.txt](#) to determine how the superseded data were derived.

DN0965

DN0965\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SQC3311053242(NAD 83)

DN0965\_MARKER: I = METAL ROD

DN0965\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

DN0965\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

DN0965\_STAMPING: T 212 1986

DN0965\_MARK LOGO: NGS

DN0965\_PROJECTION: FLUSH

DN0965\_MAGNETIC: N = NO MAGNETIC MATERIAL

DN0965\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

DN0965\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

DN0965+SATELLITE: SATELLITE OBSERVATIONS - February 20, 2007

DN0965\_ROD/PIPE-DEPTH: 4.9 meters

DN0965

DN0965 HISTORY	- Date	Condition	Report By
DN0965 HISTORY	- 1986	MONUMENTED	NGS
DN0965 HISTORY	- 19930407	GOOD	NGS
DN0965 HISTORY	- 19990825	GOOD	NGS
DN0965 HISTORY	- 20070220	GOOD	AIRDAT

DN0965

DN0965 STATION DESCRIPTION

DN0965

DN0965'DESCRIBED BY NATIONAL GEODETIC SURVEY 1986

DN0965'14.4 KM (8.95 MI) SW FROM DURANT.

DN0965'THE MARK IS 0.3 M BELOW THE HIGHWAY.

DN0965'14.4 KM (8.95 MI) SOUTHWESTERLY ALONG U.S. HIGHWAY 69 BUSINESS ROUTE

DN0965'AND U.S. HIGHWAY 69 FROM ITS JUNCTION WITH U.S. HIGHWAY 70 IN DURANT,

DN0965'43.0 M (141.1 FT) EAST-NORTHEAST OF THE NORTHEAST CORNER OF THE PEANUT

DN0965'SHOPPE BUILDING, 27.7 M (90.9 FT) NORTHWEST OF THE CENTERLINE OF THE

DN0965'SOUTHWEST BOUND LANES OF THE HIGHWAY, 23.8 M (78.1 FT) NORTHEAST OF  
DN0965'THE CENTER OF A PAVED ENTRANCE TO THE SHOPPE, AND 2.9 M (9.5 FT)  
DN0965'NORTHEAST OF A UTILITY POLE. NOTE--ACCESS TO DATUM POINT IS HAD  
DN0965'THROUGH A 5-INCH LOGO CAP.

DN0965'THE MARK IS 0.4 METERS SE FROM A WITNESS POST AND FENCE

DN0965

DN0965 STATION RECOVERY (1993)

DN0965

DN0965'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993

DN0965'STATION IS LOCATED ABOUT 15 KM (9.30 MI) SOUTHWEST OF DURANT, 9 KM  
DN0965'(5.60 MI) NORTH-NORTHEAST OF THE NORTH END OF THE HIGHWAYS 69 AND 75  
DN0965'BRIDGE OVER THE RED RIVER AT THE OKLAHOMA-TEXAS STATE LINE, ALONG  
DN0965'HIGHWAYS 69 AND 75, AT MILE 6.1, ON THE RIGHT-OF-WAY, ADJACENT TO A  
DN0965'PHILLIPS SERVICE STATION AND STORE, AT A SMALL ANIMAL HOLDING PEN.  
DN0965'OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.  
DN0965'TO REACH FROM THE NORTH END OF THE RED RIVER BRIDGE AT THE STATE  
LINE,

DN0965'GO NORTH ON US HIGHWAYS 69 AND 75 FOR 6.83 KM (4.25 MI) TO THE  
DN0965'PLATTER OVERPASS. CONTINUE AHEAD FOR 2.67 KM (1.65 MI) TO A MEDIAN  
DN0965'CROSSOVER ON THE LEFT AT THE PHILLIPS STATION AND STORE. TURN LEFT  
DN0965'INTO STORE PARKING LOT AND STATION ON THE RIGHT.

DN0965'STATION MARK IS THE TOP CENTER OF A STAINLESS STEEL ROD IN A GREASE  
DN0965'FILLED SLEEVE ENCASED IN A PVC PIPE WITH LOGO CAP SURROUNDED BY  
DN0965'CONCRETE SET 5 CM BELOW GROUND IN A MOWED AREA. IT IS 27.6 M  
DN0965'(90.6 FT) NORTHWEST OF, AND SLIGHTLY LOWER THAN THE CENTER OF THE  
DN0965'SOUTHBOUND HIGHWAY LANES, 0.4 M (1.3 FT) SOUTH-SOUTHEAST OF A  
DN0965'FIBERGLASS WITNESS POST IN THE RIGHT-OF-WAY FENCE, 1.3 M (4.3 FT)  
DN0965'EAST-NORTHEAST OF A T-FENCE CORNER, 4.0 M (13.1 FT) NORTHEAST OF  
DN0965'POWERLINE POLE T 29-2 (WITH FOUR-WAY LINES), AND 10.0 M (32.8 FT)  
DN0965'NORTHEAST OF THE EAST CORNER OF THE CONCRETE PARKING AREA.

DN0965

DN0965 STATION RECOVERY (1999)

DN0965

DN0965'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (CSM)

DN0965'THE STATION IS LOCATED ABOUT 15.23 KM (9.45 MI) SOUTHWEST OF DURANT,  
DN0965'ABOUT 10.46 KM (6.50 MI) NORTHEAST OF THE OKLAHOMA-TEXAS STATE LINES,  
DN0965'AT COMBINED US HIGHWAYS 69 AND 75 HIGHWAY MILE 6.1, ON THE NORTHWEST  
DN0965'SIDE OF HIGHWAY RIGHT-OF-WAY, NEAR THE EAST CORNER OF THE CONCRETE  
DN0965'PARKING LOT OF A PHILLIPS SERVICE STATION-CONVENIENCE STORE.  
DN0965'OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION. TO REACH THE  
DN0965'STATION FROM THE NORTH END OF COMBINED US HIGHWAYS 69 AND 75  
HIGHWAY

DN0965'BRIDGE OVER THE RED RIVER AT THE OKLAHOMA-TEXAS STATE LINES,  
LOCATED

DN0965'ABOUT 24.14 KM (15.00 MI) SOUTHWEST OF DURANT, GO NORTHEAST ON THE  
DN0965'HIGHWAY FOR 9.5 KM (5.90 MI) TO A MEDIAN CROSSOVER AT HIGHWAY MILE  
DN0965'6.1. TURN LEFT, NORTHWEST CROSSING THE SOUTHWEST BOUND LANE OF THE  
DN0965'HIGHWAY INTO THE ENTRANCE DRIVE OF A PHILLIPS SERVICE STATION FOR  
DN0965'ABOUT 100 FT (30.5 M) TO THE SOUTHWEST EDGE OF THE CONCRETE PARKING  
DN0965'LOT AND THE STATION ON THE RIGHT, BETWEEN TWO WOOD POSTS PROJECTING  
DN0965'ABOUT 1.1 M (3.6 FT) ABOVE GROUND. THE STATION IS A PUNCH MARK ON THE  
DN0965'TOP OF A STAINLESS STEEL ROD IN A GREASE-FILLED SLEEVE, ENCASED IN A  
DN0965'13 CM PVC PIPE WITH AN NGS LOGO CAP SURROUNDED BY CONCRETE RECESSED

5

DN0965'CM BELOW GROUND. LOCATED 27.59 M (90.52 FT) NORTHWEST OF THE  
DN0965'SOUTHWEST BOUND LANE OF THE HIGHWAY, 23.93 M (78.51 FT) NORTHEAST OF



DN0965 THE CENTER OF THE ENTRANCE DRIVE, 10.0 M (32.8 FT) NORTHEAST OF THE  
DN0965 EAST CORNER OF THE CONCRETE PARKING LOT OF THE SERVICE STATION AND  
0.4

DN0965 M (1.3 FT) SOUTHEAST OF A WITNESS POST.

DN0965

DN0965 STATION RECOVERY (2007)

DN0965

DN0965 RECOVERY NOTE BY AERIAL DATA SERVICE INCORPORATED 2007 (KEG)

DN0965 RECOVERED AS DESCRIBED.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL0224 \*\*\*\*\*

EL0224 FBN - This is a Federal Base Network Control Station.

**EL0224 DESIGNATION - W 56**

EL0224 PID - EL0224

EL0224 STATE/COUNTY- OK/PONTOTOC

EL0224 USGS QUAD - ROFF SOUTH (1993)

EL0224

EL0224 \*CURRENT SURVEY CONTROL

EL0224

EL0224\* NAD 83(2007)- 34 36 27.73842(N) 096 51 18.47428(W) ADJUSTED

EL0224\* NAVD 88 - 389.875 (meters) 1279.11 (feet) ADJUSTED

EL0224

EL0224 EPOCH DATE - 2002.00

EL0224 X - -627,301.138 (meters) COMP

EL0224 Y - -5,217,995.113 (meters) COMP

EL0224 Z - 3,602,339.164 (meters) COMP

EL0224 LAPLACE CORR- -2.22 (seconds) DEFLEC09

EL0224 ELLIP HEIGHT- 364.357 (meters) (02/10/07) ADJUSTED

EL0224 GEOID HEIGHT- -25.52 (meters) GEOID09

EL0224 DYNAMIC HT - 389.488 (meters) 1277.85 (feet) COMP

EL0224

EL0224 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL0224 Type PID Designation North East Ellip

EL0224 -----

EL0224 NETWORK EL0224 W 56 0.51 0.41 1.22

EL0224 -----

EL0224 MODELED GRAV- 979,630.2 (mgal) NAVD 88

EL0224

EL0224 VERT ORDER - SECOND CLASS 0

EL0224

EL0224.The horizontal coordinates were established by GPS observations

EL0224.and adjusted by the National Geodetic Survey in February 2007.

EL0224

EL0224.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL0224.See [National Readjustment](#) for more information.

EL0224.The horizontal coordinates are valid at the epoch date displayed above.

EL0224.The epoch date for horizontal control is a decimal equivalence

EL0224.of Year/Month/Day.

EL0224

EL0224.The orthometric height was determined by differential leveling and

EL0224.adjusted in June 1991.

EL0224

EL0224.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL0224

EL0224.The Laplace correction was computed from DEFLEC09 derived deflections.

EL0224

EL0224.The ellipsoidal height was determined by GPS observations

EL0224.and is referenced to NAD 83.

EL0224

EL0224.The geoid height was determined by GEOID09.

EL0224

EL0224.The dynamic height is computed by dividing the NAVD 88  
EL0224.geopotential number by the normal gravity value computed on the  
EL0224.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
EL0224.degrees latitude (g = 980.6199 gals.).

EL0224

EL0224.The modeled gravity was interpolated from observed gravity values.

EL0224

EL0224;	North	East	Units	Scale Factor	Converg.
EL0224;SPC OK S	- 141,953.039	705,000.301	MT	0.99993603	+0 38 59.4
EL0224;SPC OK S	- 465,724.26	2,312,988.49	sFT	0.99993603	+0 38 59.4
EL0224;UTM 14	- 3,831,631.764	696,668.719	MT	1.00007676	+1 13 06.9

EL0224

EL0224! - Elev Factor x Scale Factor = Combined Factor

EL0224!SPC OK S - 0.99994281 x 0.99993603 = 0.99987884

EL0224!UTM 14 - 0.99994281 x 1.00007676 = 1.00001956

EL0224

EL0224

#### SUPERSEDED SURVEY CONTROL

EL0224

EL0224 ELLIP H (06/09/00)	364.356 (m)	GP( ) 2 2
EL0224 NAD 83(1993)-	34 36 27.73808(N)	096 51 18.47422(W) AD( ) B
EL0224 ELLIP H (05/09/94)	364.414 (m)	GP( ) 4 2
EL0224 NAD 83(1986)-	34 36 27.74339(N)	096 51 18.45980(W) AD( ) 2
EL0224 NAVD 88 (05/09/94)	389.87 (m)	1279.1 (f) LEVELING 3
EL0224 NGVD 29 (??/??/92)	389.776 (m)	1278.79 (f) ADJ UNCH 2 0

EL0224

EL0224.Superseded values are not recommended for survey control.

EL0224.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL0224.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL0224

EL0224 \_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPD9666831631(NAD 83)

EL0224 \_MARKER: DB = BENCH MARK DISK

EL0224 \_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

EL0224 \_SP\_SET: SQUARE CONCRETE MONUMENT

EL0224 \_STAMPING: W 56 1934

EL0224 \_MARK LOGO: CGS

EL0224 \_MAGNETIC: N = NO MAGNETIC MATERIAL

EL0224 \_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

EL0224+STABILITY: SURFACE MOTION

EL0224 \_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL0224+SATELLITE: SATELLITE OBSERVATIONS - August 19, 1999

EL0224

EL0224 HISTORY	- Date	Condition	Report By
EL0224 HISTORY	- 1934	MONUMENTED	CGS
EL0224 HISTORY	- 19890301	GOOD	NGS
EL0224 HISTORY	- 19930504	GOOD	NGS
EL0224 HISTORY	- 19990819	GOOD	NGS

EL0224

EL0224

#### STATION DESCRIPTION

EL0224

EL0224'DESCRIBED BY COAST AND GEODETIC SURVEY 1934

EL0224'1.4 MI S FROM ROFF.

EL0224'1.4 MILES SOUTH OF STL. AND SF RR. STATION AT ROFF. 150 FEET

EL0224'SOUTH OF MILE POLE 564/25. 48 FEET EAST OF NEAREST RAIL OF

EL0224'ST. LOUIS AND SAN FRANCISCO RAILWAY TRACK. 30 FEET SOUTH OF

EL0224'CENTER LINE OF SECTION LINE ROAD, ONE MILE NORTH PONTOTOC AND

EL0224 MURRAY COUNTY LINE. INSIDE OF RAILROAD PROPERTY FENCE.

EL0224

EL0224 STATION RECOVERY (1989)

EL0224

EL0224 RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1989

EL0224 THE STATION WAS RECOVERED IN GOOD CONDITION, A NEW DESCRIPTION  
EL0224 FOLLOWS.

EL0224 THE STATION IS LOCATED ABOUT 23.4 KM (14.55 MI) NORTH-NORTHWEST OF

EL0224 MILL CREEK, 14.8 KM (9.20 MI) NORTHEAST OF SULPHUR, AND 2.5 KM

EL0224 (1.55 MI) SOUTHWEST OF ROFF. OWNERSHIP--PONTOTOC COUNTY.

EL0224 TO REACH THE STATION FROM THE POST OFFICE IN ROFF, GO SOUTHERLY ON  
EL0224 STATE HIGHWAY 1 FOR 2.4 KM (1.50 MI) TO A GRAVEL ROAD ON THE RIGHT.

EL0224 TURN RIGHT AND GO WEST ON COUNTY ROAD 166 FOR 0.9 KM (0.55 MI) TO THE  
EL0224 STATION ON THE LEFT, JUST BEFORE CROSSING THE BURLINGTON NORTHERN

EL0224 RAILROAD.

EL0224 THE STATION IS A STANDARD CGS DISK SET IN THE TOP OF A 30 CM SQUARE

EL0224 CONCRETE POST THAT PROJECTS 30 CM ABOVE THE GROUND. LOCATED 14.0 M

EL0224 (45.9 FT) EAST OF THE NEAR RAIL, 7.0 M (23.0 FT) SOUTH OF THE CENTER

EL0224 OF THE ROAD, 3.1 M (10.2 FT) NORTHWEST OF THE CENTER OF A GATE AND

EL0224 FIELD ENTRANCE, 1.9 M (6.2 FT) NORTH-NORTHWEST OF A FENCE CORNER, AND

EL0224 0.6 M (2.0 FT) WEST OF A CARSONITE WITNESS POST.

EL0224 DESCRIBED BY E.J. HANSMANN, TYPED BY RLZ.

EL0224

EL0224 STATION RECOVERY (1993)

EL0224

EL0224 RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993

EL0224 THE STATION IS LOCATED ABOUT 21 KM (13.05 MI) SOUTHWEST OF ADA, 14 KM

EL0224 (8.70 MI) NORTHEAST OF SULPHUR, 2 KM (1.25 MI) SOUTH OF ROFF IN LOW

EL0224 BRUSH IN THE SOUTHEAST QUADRANT OF THE JUNCTION OF A GRAVEL ROAD  
AND

EL0224 A RAILROAD AND IN THE RAILROAD RIGHT-OF-WAY. OWNERSHIP--ST LOUIS SAN  
EL0224 FRANCISCO RAILROAD.

EL0224 TO REACH FROM THE T-JUNCTION OF STATE HIGHWAY 1 AND THE NORTH END OF

EL0224 THE CHICKISAW TURNPIKE, ABOUT 5 KM (3.10 MI) NORTH OF ROFF, GO SOUTH

EL0224 ON HIGHWAY 1 FOR 5.8 KM (3.60 MI) TO INTERSECTION OF STATE HIGHWAY 1

EL0224 (MAIN STREET) AND BROADWAY, ON THE EAST SIDE OF THE HIGH SCHOOL IN

EL0224 THE CENTER ROFF. CONTINUE AHEAD, SOUTH, ON HIGHWAY 1 FOR 1.17 KM

EL0224 (0.70 MI) TO A GRAVEL ROAD ON THE LEFT (CHOCTAW ROAD) AND A

EL0224 TRANSMISSION TOWER ON THE RIGHT ON THE SOUTH SIDE OF ROFF. CONTINUE

EL0224 AHEAD, SOUTH, ON HIGHWAY 1 FOR 1.33 KM (0.80 MI) TO A GRAVEL ROAD ON

EL0224 THE RIGHT (COUNTY ROAD 166). TURN RIGHT, WEST, ON COUNTY ROAD 166

EL0224 FOR 0.95 KM (0.60 MI) TO THE STATION ON THE LEFT JUST BEFORE A

EL0224 RAILROAD CROSSING.

EL0224 THE STATION IS SET IN THE TOP OF A 25 CM SQUARE CONCRETE POST

EL0224 PROJECTING 25 CM. IT IS 14.0 M (45.9 FT) EAST FROM THE EAST RAIL OF

EL0224 THE RAILROAD TRACKS, 7.1 M (23.3 FT) SOUTH FROM THE CENTER OF THE

EL0224 GRAVEL ROAD, 10.2 M (33.5 FT) NORTH-NORTHEAST FROM A POWER POLE, 2.3

EL0224 M (7.5 FT) NORTH FROM TELEPHONE CABLE POST NUMBER RPL 835 1057, 1.9 M

EL0224 (6.2 FT) NORTH-NORTHWEST FROM A STEEL FENCE CORNER POST AT A GATE,

EL0224 AND 0.55 M (1.80 FT) WEST FROM A FIBERGLASS WITNESS POST.

EL0224 DESCRIBED BY D.G. AUG

EL0224

EL0224 STATION RECOVERY (1999)

EL0224

EL0224 RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (CSM)

EL0224 THE STATION IS LOCATED ABOUT 2.5 KM (1.55 MI) SOUTHWEST OF THE CENTER

EL0224'OF ROFF AND JUST SOUTHEAST OF A RAILROAD CROSSING A GRAVEL ROAD.  
EL0224'OWNERSHIP--ST LOUIS AND SAN FRANCISCO RAILROAD. TO REACH THE STATION  
EL0224'FROM THE POST OFFICE IN ROFF, LOCATED AT THE JUNCTION OF MAIN STREET  
EL0224'(STATE HIGHWAY 1) AND 9TH STREET, GO SOUTH ON MAIN STREET (HIGHWAY 1)  
EL0224'FOR 2.33 KM (1.45 MI) TO THE JUNCTION OF A GRAVEL ROAD ON THE RIGHT.  
EL0224'TURN RIGHT, WEST ON THE ROAD FOR 0.97 KM (0.60 MI) TO THE STATION ON  
EL0224'THE LEFT. THE STATION IS SET IN THE TOP OF A 25 CM CONCRETE POST  
EL0224'PROJECTING 20 CM ABOVE GROUND. LOCATED 14.02 M (46.00 FT) EAST OF THE  
EL0224'EAST RAIL OF THE TRACKS, 7.17 M (23.52 FT) SOUTH OF THE CENTER OF THE  
EL0224'ROAD, 1.9 M (6.2 FT) NORTH-NORTHWEST OF THE NORTHEAST METAL CORNER  
EL0224'GATE POST OF A FENCE AND 0.6 M (2.0 FT) WEST OF A FIBERGLASS WITNESS  
EL0224'POST.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EK0956 \*\*\*\*\*

EK0956 CBN - This is a Cooperative Base Network Control Station.

**EK0956 DESIGNATION - ALBION**

EK0956 PID - EK0956

EK0956 STATE/COUNTY- OK/PUSHMATAHA

EK0956 USGS QUAD - ALBION (1976)

EK0956

EK0956 \*CURRENT SURVEY CONTROL

EK0956

EK0956\* NAD 83(2007)- 34 39 28.02352(N) 095 06 21.82597(W) ADJUSTED

EK0956\* NAVD 88 - 209.187 (meters) 686.31 (feet) ADJUSTED

EK0956

EK0956 EPOCH DATE - 2002.00

EK0956 X - -467,449.115 (meters) COMP

EK0956 Y - -5,231,412.607 (meters) COMP

EK0956 Z - 3,606,804.258 (meters) COMP

EK0956 LAPLACE CORR- -0.75 (seconds) DEFLEC09

EK0956 ELLIP HEIGHT- 177.464 (meters) (02/10/07) ADJUSTED

EK0956 GEOID HEIGHT- -31.71 (meters) GEOID09

EK0956 DYNAMIC HT - 208.962 (meters) 685.57 (feet) COMP

EK0956

EK0956 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EK0956 Type PID Designation North East Ellip

EK0956 -----

EK0956 NETWORK EK0956 ALBION 1.47 1.12 3.35

EK0956 -----

EK0956 MODELED GRAV- 979,556.0 (mgal) NAVD 88

EK0956

EK0956 VERT ORDER - FIRST CLASS II

EK0956

EK0956.The horizontal coordinates were established by GPS observations

EK0956.and adjusted by the National Geodetic Survey in February 2007.

EK0956

EK0956.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EK0956.See [National Readjustment](#) for more information.

EK0956.The horizontal coordinates are valid at the epoch date displayed above.

EK0956.The epoch date for horizontal control is a decimal equivalence

EK0956.of Year/Month/Day.

EK0956

EK0956.The orthometric height was determined by differential leveling and

EK0956.adjusted in August 1994.

EK0956

EK0956.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EK0956

EK0956.The Laplace correction was computed from DEFLEC09 derived deflections.

EK0956

EK0956.The ellipsoidal height was determined by GPS observations

EK0956.and is referenced to NAD 83.

EK0956

EK0956.The geoid height was determined by GEOID09.

EK0956

EK0956.The dynamic height is computed by dividing the NAVD 88  
EK0956.geopotential number by the normal gravity value computed on the  
EK0956.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
EK0956.degrees latitude (g = 980.6199 gals.).

EK0956

EK0956.The modeled gravity was interpolated from observed gravity values.

EK0956

EK0956;	North	East	Units	Scale Factor	Converg.
EK0956;SPC OK S	- 150,714.900	865,224.280	MT	0.99993676	+1 38 33.5
EK0956;SPC OK S	- 494,470.47	2,838,656.66	sFT	0.99993676	+1 38 33.5
EK0956;UTM 15	- 3,837,111.345	307,006.126	MT	1.00005910	-1 11 52.9

EK0956

EK0956! - Elev Factor x Scale Factor = Combined Factor

EK0956!SPC OK S - 0.99997214 x 0.99993676 = 0.99990891

EK0956!UTM 15 - 0.99997214 x 1.00005910 = 1.00003124

EK0956

EK0956:	Primary Azimuth Mark	Grid Az
EK0956:SPC OK S	- ALBION AZ MK	033 17 10.9
EK0956:UTM 15	- ALBION AZ MK	036 07 37.3

EK0956

EK0956	PID	Reference Object	Distance	Geod. Az
EK0956			dddmmss.s	
EK0956	EK1045	ALBION AZ MK		0345544.4
EK0956	EK1043	ALBION RM 1	27.702 METERS	03934
EK0956	CX9523	ALBION RM 2	27.426 METERS	30920
EK0956	EK1044	ALBION RM 3	34.461 METERS	32015

EK0956

EK0956 SUPERSEDED SURVEY CONTROL

EK0956

EK0956	ELLIP H (04/16/01)	177.459 (m)	GP( ) 4 2
EK0956	NAD 83(1993)-	34 39 28.02349(N)	095 06 21.82580(W) AD( ) B
EK0956	ELLIP H (05/09/94)	177.566 (m)	GP( ) 4 2
EK0956	NAD 83(1986)-	34 39 28.02605(N)	095 06 21.81275(W) AD( ) 1
EK0956	NAD 27	- 34 39 27.65700(N)	095 06 20.95200(W) AD( ) 1
EK0956	NAVD 88 (01/13/95)	209.19 (m)	686.3 (f) LEVELING 3
EK0956	NGVD 29 (11/30/89)	208.6 (m)	684. (f) GPS OBS

EK0956

EK0956.Superseded values are not recommended for survey control.

EK0956.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EK0956.[See file dsdata.txt](#) to determine how the superseded data were derived.

EK0956

EK0956\_U.S. NATIONAL GRID SPATIAL ADDRESS: 15SUU0700637111(NAD 83)

EK0956\_MARKER: DS = TRIANGULATION STATION DISK

EK0956\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

EK0956\_SP\_SET: SQUARE CONCRETE MONUMENT

EK0956\_STAMPING: ALBION 1952

EK0956\_MARK LOGO: CGS

EK0956\_MAGNETIC: N = NO MAGNETIC MATERIAL

EK0956\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

EK0956+STABILITY: SURFACE MOTION

EK0956\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EK0956+SATELLITE: SATELLITE OBSERVATIONS - March 11, 1994

EK0956

EK0956 HISTORY	- Date	Condition	Report By
EK0956 HISTORY	- 1952	MONUMENTED	CGS
EK0956 HISTORY	- 1952	GOOD	CGS
EK0956 HISTORY	- 1957	GOOD	CGS
EK0956 HISTORY	- 19890301	GOOD	NGS
EK0956 HISTORY	- 19900306	GOOD	NGS
EK0956 HISTORY	- 19930504	GOOD	NGS
EK0956 HISTORY	- 19940311	GOOD	NGS

EK0956

EK0956 STATION DESCRIPTION

EK0956

EK0956'DESCRIBED BY COAST AND GEODETIC SURVEY 1952 (DAJ)

EK0956'STATION IS LOCATED ABOUT 1/2 MILE SOUTHWEST OF THE CENTER

EK0956'OF ALBION ALONG THE RIGHT OF WAY OF U.S. HIGHWAY 271.

EK0956'STATION IS 80 SOUTH SOUTHWEST OF BRACE POLE WITH TRIANGLE

EK0956'BLAZE, 56 FEET SOUTHEAST OF APPROXIMATE CENTERLINE OF

EK0956'HIGHWAY AND 3 FEET NORTH OF WITNESS POST. THE MARK PROJECTS

EK0956'ABOUT 4 INCHES AND THE DISK IS STAMPED ALBION 1952.

EK0956'

EK0956'REFERENCE MARK NO. 1 IS 52 FEET SOUTHEAST OF THE APPROXIMATE

EK0956'CENTERLINE OF HIGHWAY, 32 FEET EAST SOUTHEAST OF BRACE POLE

EK0956'WITH TRIANGLE BLAZE AND 7 FEET SOUTHEAST OF FENCE.

EK0956'THE DISK IS SET FLUSH IN A DRILL HOLE IN OUTCROPPING ROCK

EK0956'AND IS STAMPED ALBION NO 1 1952.

EK0956'

EK0956'REFERENCE MARK NO. 2 IS 44 FEET NORTHWEST OF THE APPROXIMATE

EK0956'CENTERLINE OF HIGHWAY AND 9 FEET SOUTHEAST OF THE APPROXIMATE

EK0956'CENTERLINE OF DRIVEWAY. THE MARK PROJECTS ABOUT 6 INCHES

EK0956'AND THE DISK IS STAMPED ALBION NO 2 1952.

EK0956'

EK0956'AZIMUTH MARK IS 38 FEET NORTHWEST OF THE APPROXIMATE CENTERLINE

EK0956'OF HIGHWAY, 17 FEET EAST OF FENCE CORNER, 9 FEET SOUTHEAST

EK0956'OF FENCE AND 2.5 FEET WEST OF WITNESS POST. THE MARK PROJECTS

EK0956'ABOUT 4 INCHES AND THE DISK IS STAMPED ALBION 1952.

EK0956'

EK0956'TO REACH FROM THE NORTH SIDE OF SMALL PARK, 1/2 BLOCK SOUTH

EK0956'OF THE POST OFFICE IN ALBION, GO WEST AND SOUTHWEST ON

EK0956'U.S. HIGHWAY 271 FOR 0.2 MILE TO AZIMUTH ON RIGHT OR NORTHWEST

EK0956'SIDE OF HIGHWAY AS DESCRIBED. CONTINUE SOUTHWEST FOR 0.35

EK0956'MILE TO STATION ON LEFT OR SOUTHEAST SIDE OF HIGHWAY AS

EK0956'DESCRIBED.

EK0956'

EK0956'HEIGHT OF LIGHT ABOVE STATION MARK 23 METERS.

EK0956

EK0956 STATION RECOVERY (1952)

EK0956

EK0956'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1952

EK0956'RECOVERED IN GOOD CONDITION.

EK0956

EK0956 STATION RECOVERY (1957)

EK0956

EK0956'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1957 (PT)

EK0956'THIS STATION WAS RECOVERED IN GOOD CONDITION AS DESCRIBED.

EK0956'THE AZIMUTH MARK AND REFERENCE MARK NO. 1 WERE ALSO IN GOOD

EK0956'CONDITION AS DESCRIBED. REFERENCE MARK NO. 2 WAS FOUND OUT

EK0956'OF THE GROUND AND WAS RESET AND STAMPED ALBION 1952 R.M.



EK0956'NO. 3 1957.

EK0956'

EK0956'REFERENCE MARK NO. 3 IS ACROSS THE HIGHWAY NORTH FROM THE EK0956'STATION, 1 FOOT SOUTH OF THE NORTH RIGHT-OF-WAY FENCE WHICH EK0956'IS BACKSET FROM THE HIGHWAY ABOUT ABOUT 10 FEET. IT EK0956'IS ALONG THE SOUTH FENCE LINE OF A BARNYARD AND ABOUT 50 EK0956'YARDS SOUTHEAST OF A BROWN HOUSE, AND PROJECTS ABOUT 4 INCHES.

EK0956

EK0956                   STATION RECOVERY (1989)

EK0956

EK0956'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1989

EK0956'THE STATION WAS RECOVERED IN GOOD CONDITION, A NEW DESCRIPTION EK0956'FOLLOWS.

EK0956'THE STATION IS LOCATED ABOUT 16.5 KM (10.25 MI) NORTHEAST OF EK0956'TUSKAHOME, 11.8 KM (7.35 MI) SOUTH-SOUTHWEST OF TALAHINA, AND 0.8 KM EK0956'(0.50 MI) SOUTHWEST OF ALBION. OWNERSHIP--STATE HIGHWAY DEPARTMENT. EK0956'TO REACH THE STATION FROM THE TOWN HALL IN ALBION, GO SOUTHWEST ON EK0956'U.S. HIGHWAY 271 FOR 0.8 KM (0.50 MI) TO THE STATION ON THE LEFT.

EK0956'THE STATION IS A STANDARD CGS DISK SET IN THE TOP OF A 20 CM SQUARE EK0956'CONCRETE POST THAT PROJECTS 8 CM ABOVE THE GROUND. LOCATED 22.3 M EK0956'(73.2 FT) SOUTHWEST OF A BRACE POLE WITH A GUY WIRE, 17.8 M (58.4 FT) EK0956'SOUTHEAST OF THE CENTERLINE OF THE HIGHWAY, 8.1 M (26.6 FT) NORTH OF EK0956'THE NORTH POST OF A SIGN (ALBION FIRST BAPTIST CHURCH), AND 0.9 M EK0956'(3.0 FT) NORTHWEST OF A CARSONITE WITNESS POST.

EK0956'DESCRIBED BY E.J. HANSMANN, TYPED BY RLZ.

EK0956

EK0956                   STATION RECOVERY (1990)

EK0956

EK0956'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1990

EK0956'STATION WAS RECOVERED IN GOOD CONDITION, AND NO OTHER MARKS SEARCHED

EK0956'FOR. A COMPLETE NEW DEACRIPTION FOLLOWS.

EK0956'STATION IS LOCATED ABOUT 0.81 KM (0.50 MI) SOUTHWEST OF THE CENTER OF EK0956'ALBION, ALONG THE R-O-W OF U.S.HIGHWAY 271, ABOUT 0.72 KM (0.45 MI) EK0956'SOUTHWEST OF ALBION GROCERY STORE, ABOUT 0.81 KM (0.50 MI) SOUTHWEST EK0956'OF THE U.S.POST OFFICE IN ALBION. OWNERSHIP-STATE OF OKLAHOMA. EK0956'TO REACH THE STATION FROM A SMALL CITY PARK, LOCATED ABOUT 1/2 BLOCK EK0956'NORTHEAST OF THE U.S.POST OFFICE IN ALBION, GO SOUTHWESTERLY ALONG EK0956'U.S.HIGHWAY 271 FOR 0.85 KM (0.53 MI) TO WHERE A GUY WIRE FROM A EK0956'SUPPORT POLE CROSSES THE HIGHWAY AND THE STATION ON THE LEFT AS EK0956'DESCRIBED.

EK0956'STATION IS ABOUT 45 M (147.6 FT) SOUTH OF A ALBION CITY LIMITS SIGN

EK0956'POST, 25 M (82.0 FT) SOUTH-SOUTHWEST OF A BRACE POLE, 17.9 M

EK0956'(58.7 FT) SOUTHEAST OF THE CENTERLINE OF THE HIGHWAY, 8.1 M

EK0956'(26.6 FT) NORTH-NORTHWEST OF THE NORTHWEST SUPPORT POLE OF A ALBION

EK0956'BAPTIST CHURCH SUPPORT SIGN, 1.0 M (3.3 FT) NORTHWEST OF A FIBERGLASS

EK0956'WITNESS POST, ACCROSS THE HIGHWAY FROM THE NORTHEAST END OF A 40 FT

EK0956'(12.2 M) OFFSET IN THE R-O-W FENCELINE, AND ABOUT 1.2 M (3.9 FT)

EK0956'ABOVE THE LEVEL OF THE HIGHWAY.

EK0956'DESCRIBED BY G.F.S. CAN CROSS BAR DITCH WITH TRUCK WHEN DRY ONLY.

EK0956

EK0956                   STATION RECOVERY (1993)

EK0956

EK0956'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993

EK0956'THE STATION AND RM 1 WERE RECOVERED IN GOOD CONDITION. RM 2 AND THE EK0956'AZIMUTH MARK WERE SEARCHED FOR BUT NOT FOUND.

EK0956'NOTE--CONES SHOULD BE USED WHEN OCCUPYING THIS STATION BECAUSE THE EK0956'SHOULDER AREA IS NARROW.  
EK0956'THE STATION IS LOCATED ABOUT 34 KM (21.10 MI) SOUTHEAST OF WILBURTON, EK0956'12 KM (7.45 MI) SOUTHWEST OF TALIHINA, 1 KM (0.60 MI) SOUTHWEST OF EK0956'ALBION IN A ROCKY GRASS AND BRUSH AREA AND IN THE HIGHWAY RIGHT OF EK0956'WAY. OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.  
EK0956'TO REACH FROM THE T-JUNCTION OF U.S. HIGHWAY 271 AND STATE HIGHWAY 63 EK0956'EAST ON THE SOUTHEAST SIDE OF TALIHINA, GO SOUTH ON HIGHWAY 271 FOR EK0956'1.6 KM (1.00 MI) TO A BRIDGE OVER ROCK CREEK. CONTINUE AHEAD, SOUTH, EK0956'ON HIGHWAY 271 FOR 1.7 KM (1.05 MI) TO A BRIDGE OVER JACKSON CREEK. EK0956'CONTINUE AHEAD, SOUTH, ON HIGHWAY 271 FOR 3.5 KM (2.15 MI) TO A PAVED EK0956'T-JUNCTION ON THE LEFT. CONTINUE AHEAD, SOUTH-SOUTHWEST, ON HIGHWAY EK0956'271 FOR 5.9 KM (3.65 MI) TO A PAVED CROSSROAD JUST AFTER THE ALBION EK0956'FIRST BAPTIST CHURCH ON THE RIGHT IN THE CENTER OF THE SMALL TOWN OF EK0956'ALBION. CONTINUE AHEAD, SOUTHWEST, ON HIGHWAY 271 FOR 0.9 KM EK0956'(0.55 MI) TO THE STATION ON THE LEFT JUST BEFORE THE DRIVEWAY TO A EK0956'FARM HOUSE ON THE RIGHT.  
EK0956'THE STATION IS SET IN THE TOP OF A 20 CM SQUARE CONCRETE POST EK0956'PROJECTING 7 CM. IT IS 18.0 M (59.1 FT) SOUTHEAST FROM THE CENTER EK0956'OF, AND ABOUT 2 M (6.6 FT) HIGHER THAN HIGHWAY 271, 8.1 M (26.6 FT) EK0956'NORTH FROM THE NORTH LEG OF A SIGN -ALBION FIRST BAPTIST CHURCH-, 7.1 EK0956'M (23.3 FT) SOUTHEAST FROM THE TOP OF THE CUTBANK, 4.1 M (13.5 FT) EK0956'SOUTH FROM A FIBERGLASS WITNESS POST, AND 0.9 M (3.0 FT) NORTHWEST EK0956'FROM A FIBERGLASS WITNESS POST.  
EK0956'DESCRIBED BY D.G. AUG  
EK0956  
EK0956                   STATION RECOVERY (1994)  
EK0956  
EK0956'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1994  
EK0956'5.0 KM (3.10 MI) NORTHERLY ALONG STATE HIGHWAY 2 FROM THE POST OFFICE EK0956'IN CLAYTON, THENCE 20.9 KM (13.00 MI) EASTERLY ALONG U.S. HIGHWAY EK0956'271, 34.1 M (111.9 FT) SOUTHEAST OF REFERENCE MARK 3, 27.7 M EK0956'(90.9 FT) SOUTHWEST OF REFERENCE MARK 1, 22.0 M (72.2 FT) SOUTHWEST EK0956'OF A UTILITY SUPPORT POLE WITH TWO GUY CABLES, 18.0 M (59.1 FT) EK0956'SOUTHEAST OF THE HIGHWAY CENTERLINE, 4.2 M (13.8 FT) SOUTH OF A EK0956'WITNESS POST, 1.5 M (4.9 FT) ABOVE THE LEVEL OF THE HIGHWAY, AND THE EK0956'MONUMENT PROJECTS 0.1 M (0.3 FT) ABOVE THE GROUND SURFACE.

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The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FH0905 \*\*\*\*\*

FH0905 FBN - This is a Federal Base Network Control Station.

**FH0905 DESIGNATION - X 199**

FH0905 PID - FH0905

FH0905 STATE/COUNTY- OK/SEQUOYAH

FH0905 USGS QUAD - SALLISAW (1982)

FH0905

FH0905 \*CURRENT SURVEY CONTROL

FH0905

FH0905\* NAD 83(2007)- 35 26 57.18909(N) 094 49 16.56940(W) ADJUSTED

FH0905\* NAVD 88 - 161.883 (meters) 531.11 (feet) ADJUSTED

FH0905

FH0905 EPOCH DATE - 2002.00

FH0905 X - -437,198.630 (meters) COMP

FH0905 Y - -5,183,382.999 (meters) COMP

FH0905 Z - 3,678,656.214 (meters) COMP

FH0905 LAPLACE CORR- 0.37 (seconds) DEFLEC09

FH0905 ELLIP HEIGHT- 131.881 (meters) (02/10/07) ADJUSTED

FH0905 GEOID HEIGHT- -30.00 (meters) GEOID09

FH0905 DYNAMIC HT - 161.731 (meters) 530.61 (feet) COMP

FH0905

FH0905 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FH0905 Type PID Designation North East Ellip

FH0905 -----

FH0905 NETWORK FH0905 X 199 0.43 0.31 1.23

FH0905 -----

FH0905 MODELED GRAV- 979,696.7 (mgal) NAVD 88

FH0905

FH0905 VERT ORDER - FIRST CLASS II

FH0905

FH0905.The horizontal coordinates were established by GPS observations

FH0905.and adjusted by the National Geodetic Survey in February 2007.

FH0905

FH0905.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FH0905.See [National Readjustment](#) for more information.

FH0905.The horizontal coordinates are valid at the epoch date displayed above.

FH0905.The epoch date for horizontal control is a decimal equivalence

FH0905.of Year/Month/Day.

FH0905

FH0905.The orthometric height was determined by differential leveling and

FH0905.adjusted in June 1991.

FH0905

FH0905.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FH0905

FH0905.The Laplace correction was computed from DEFLEC09 derived deflections.

FH0905

FH0905.The ellipsoidal height was determined by GPS observations

FH0905.and is referenced to NAD 83.

FH0905

FH0905.The geoid height was determined by GEOID09.

FH0905

FH0905.The dynamic height is computed by dividing the NAVD 88  
 FH0905.geopotential number by the normal gravity value computed on the  
 FH0905.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
 FH0905.degrees latitude (g = 980.6199 gals.).

FH0905

FH0905.The modeled gravity was interpolated from observed gravity values.

FH0905

FH0905;	North	East	Units	Scale Factor	Converg.
FH0905;SPC OK N	- 54,566.557	888,540.898	MT	1.00002339	+1 52 33.3
FH0905;SPC OK N	- 179,023.78	2,915,154.60	sFT	1.00002339	+1 52 33.3
FH0905;UTM 15	- 3,924,385.552	334,710.362	MT	0.99993669	-1 03 23.5

FH0905

FH0905! - Elev Factor x Scale Factor = Combined Factor  
 FH0905!SPC OK N - 0.99997930 x 1.00002339 = 1.00000269  
 FH0905!UTM 15 - 0.99997930 x 0.99993669 = 0.99991599

FH0905

FH0905 SUPERSEDED SURVEY CONTROL

FH0905

FH0905 ELLIP H (06/09/00)	131.867 (m)	GP( ) 2 2
FH0905 NAD 83(1993)-	35 26 57.18981(N)	094 49 16.56947(W) AD( ) B
FH0905 ELLIP H (05/09/94)	131.972 (m)	GP( ) 4 2
FH0905 NAVD 88 (05/09/94)	161.88 (m)	531.1 (f) LEVELING 3

FH0905

FH0905.Superseded values are not recommended for survey control.

FH0905.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FH0905.[See file dsdata.txt](#) to determine how the superseded data were derived.

FH0905

FH0905\_U.S. NATIONAL GRID SPATIAL ADDRESS: 15SUV3471024385(NAD 83)

FH0905\_MARKER: I = METAL ROD

FH0905\_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

FH0905\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

FH0905\_STAMPING: X 199 1984

FH0905\_MARK LOGO: NGS

FH0905\_PROJECTION: FLUSH

FH0905\_MAGNETIC: N = NO MAGNETIC MATERIAL

FH0905\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

FH0905\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FH0905+SATELLITE: SATELLITE OBSERVATIONS - January 19, 2009

FH0905\_ROD/PIPE-DEPTH: 4.2 meters

FH0905\_SLEEVE-DEPTH : 0.9 meters

FH0905

FH0905 HISTORY	- Date	Condition	Report By
FH0905 HISTORY	- 1984	MONUMENTED	NGS
FH0905 HISTORY	- 1988	GOOD	USPSQD
FH0905 HISTORY	- 1989	GOOD	USPSQD
FH0905 HISTORY	- 1990	GOOD	USPSQD
FH0905 HISTORY	- 19930429	GOOD	NGS
FH0905 HISTORY	- 19970513	GOOD	NGS
FH0905 HISTORY	- 19990825	GOOD	NGS
FH0905 HISTORY	- 20020815	GOOD	OKDOT
FH0905 HISTORY	- 20090119	GOOD	AIRDAT
FH0905 HISTORY	- 20090119	GOOD	AIRDAT

FH0905

FH0905 STATION DESCRIPTION

FH0905

FH0905'DESCRIBED BY NATIONAL GEODETIC SURVEY 1984  
FH0905'1.4 KM (0.9 MI) WEST FROM SALLISAW.  
FH0905'THE MARK IS 0.9 M ABOVE EASTBOUND LANES.  
FH0905'1.4 KM (0.9 MI) WEST ALONG INTERSTATE HIGHWAY 40 FROM THE JUNCTION OF  
FH0905'U.S. HIGHWAY 59 (ABOUT 1.6 KM (1.0 MI) SOUTHWEST OF SALLISAW), AT MILE  
FH0905'MARKER NUMBER 307, SET NEAR THE SOUTH RIGHT-OF-WAY FENCE, 0.2 KM  
FH0905'(0.1 MI) EAST OF A TAN COLORED BRICK HOUSE, 35.20 METERS (115.5 FT)  
FH0905'SOUTH OF THE CENTERLINE OF THE EASTBOUND LANES, 26.82 METERS (88.0 FT)  
FH0905'SOUTH OF MILE MARKER NUMBER 307, 3.26 METERS (10.7 FT) NORTHEAST OF  
FH0905'THE NORTHERNMOST METAL POLE SUPPORTING A KOA CAMPGROUND SIGN,  
FH0905'0.36 METERS (1.2 FT) NORTH-NORTHEAST OF THE CENTER ONE OF THE WOOD  
FH0905'FENCE BRACE POSTS, AND 0.51 METERS (1.7 FT) NORTH OF THE FENCE. NOTE,  
FH0905'ROD DRIVEN TO REFUSAL AND ANCHORED AT THIS DEPTH.  
FH0905'THE MARK IS 0.39 METERS NW FROM A WITNESS POST.  
FH0905  
FH0905                   STATION RECOVERY (1988)  
FH0905  
FH0905'RECOVERY NOTE BY US POWER SQUADRON 1988 (MS)  
FH0905'RECOVERED IN GOOD CONDITION.  
FH0905  
FH0905                   STATION RECOVERY (1989)  
FH0905  
FH0905'RECOVERY NOTE BY US POWER SQUADRON 1989 (MS)  
FH0905'RECOVERED IN GOOD CONDITION.  
FH0905  
FH0905                   STATION RECOVERY (1990)  
FH0905  
FH0905'RECOVERY NOTE BY US POWER SQUADRON 1990 (TWS)  
FH0905'RECOVERED IN GOOD CONDITION.  
FH0905  
FH0905                   STATION RECOVERY (1993)  
FH0905  
FH0905'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993  
FH0905'STATION IS LOCATED ABOUT 3 KM (1.85 MI) SOUTHWEST OF SALLISAW, ON THE  
FH0905'SOUTH SIDE OF INTERSTATE HIGHWAY 40, ON THE RIGHT-OF-WAY, AT MILEPOST  
FH0905'307, JUST EAST OF A TWO-STORY LOG CABIN HOUSE, IN THE NORTHEAST 1/4  
FH0905'OF SECTION 12, T 11 N, R 23 E. OWNERSHIP--OKLAHOMA DEPARTMENT OF  
FH0905'TRANSPORTATION.  
FH0905'TO REACH FROM THE OVERPASS AT THE JUNCTION OF INTERSTATE HIGHWAY 40  
FH0905'AND US HIGHWAY 59 (EXIT 308) ON THE SOUTHWEST SIDE OF SALLISAW, GO  
FH0905'WEST ON HIGHWAY 40 FOR 1.79 KM (1.10 MI) TO A MEDIAN CROSSOVER. TURN  
FH0905'LEFT AND RETURN EASTBOUND FOR 0.33 KM (0.20 MI) TO THE STATION ON THE  
FH0905'RIGHT. ALSO REACHED UTILIZING THE SOUTH FRONTAGE ROAD AND CLIMBING  
FH0905'THE RIGHT-OF-WAY FENCE.  
FH0905'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN A  
FH0905'GREASE FILLED SLEEVE ENCASED IN A PVC PIPE WITH LOGO CAP SURROUNDED  
FH0905'BY CONCRETE SET 2 CM BELOW GROUND. IT IS 35.0 M (114.8 FT) SOUTH OF,  
FH0905'AND 1 M (3.3 FT) HIGHER THAN THE EASTBOUND HIGHWAY LANES, 26.4 M  
FH0905'(86.6 FT) SOUTH-SOUTHEAST OF MILEPOST 307, 0.3 M (1.0 FT) NORTH OF  
FH0905'THE CENTER ONE OF THREE BRACED WOOD FENCEPOSTS, 0.4 M (1.3 FT)  
FH0905'NORTHWEST OF A FIBERGLASS WITNESS POST, AND 22.3 M (73.2 FT) EAST OF  
FH0905'THE EXTENDED EAST WALL OF THE LOG HOUSE.  
FH0905  
FH0905                   STATION RECOVERY (1997)  
FH0905  
FH0905'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1997 (ALG)

FH0905 THE STATION WAS RECOVERED USING THE 1993 STATION RECOVERY, ALL  
FH0905 DISTANCES AND DIRECTIONS CHECKED.

FH0905

FH0905 STATION RECOVERY (1999)

FH0905

FH0905 RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (CSM)

FH0905 RECOVERED AS DESCRIBED.

FH0905

FH0905 STATION RECOVERY (2002)

FH0905

FH0905 RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 2002

FH0905 RECOVERED IN GOOD CONDITION.

FH0905

FH0905 STATION RECOVERY (2009)

FH0905

FH0905 RECOVERY NOTE BY AERIAL DATA SERVICE INCORPORATED 2009 (JJH)

FH0905 RECOVERED IN GOOD CONDITION.

FH0905

FH0905 STATION RECOVERY (2009)

FH0905

FH0905 RECOVERY NOTE BY AERIAL DATA SERVICE INCORPORATED 2009 (KEG)

FH0905 RECOVERED IN GOOD CONDITION.

DRAFT

DRAFT

**NGS Monuments Used as Checkshots**

## NGS MONUMENTS USED AS CHECKSHOTS

FK0476 DESIGNATION - F 105 .....	2
FK0637 DESIGNATION - 57 WHV .....	4
EM1085 DESIGNATION - 21 K 35 .....	7
FK0076 DESIGNATION - Q 31 .....	9
EL0535 DESIGNATION - X 42 .....	11
EL1055 DESIGNATION - STEALY .....	14
EL0431 DESIGNATION - A 81 .....	17
EL1053 DESIGNATION - HOPEWELL .....	20
EL0811 DESIGNATION - JESSE .....	23
FK0640 DESIGNATION - COWDEN .....	26
EM0216 DESIGNATION - K 29 .....	28
EM0162 DESIGNATION - UPTO .....	31
FK0486 DESIGNATION - R 103 .....	36
FK0483 DESIGNATION - U 103 .....	38
FK0467 DESIGNATION - W 104 .....	40
FK0263 DESIGNATION - 9 D 60 .....	42
FK0261 DESIGNATION - H 114 .....	44
GH0124 DESIGNATION - T 47 .....	47
FJ0719 DESIGNATION - D 194 .....	49
FJ0463 DESIGNATION - F 186 .....	52
FK0651 DESIGNATION - N 216 .....	55
FK0151 DESIGNATION - J 28 .....	57
EL0510 DESIGNATION - C 155 .....	60
AJ8118 DESIGNATION - CSM A 2001 .....	62
AJ8119 DESIGNATION - CSM B 2001 .....	65
FK0153 DESIGNATION - L 28 .....	68
FK0194 DESIGNATION - W 2 .....	70
FK0215 PID - FK0215 .....	73
FJ0788 DESIGNATION - T 214 .....	77
FJ0790 DESIGNATION - POCASSET AZ MK .....	79
AC9182 DESIGNATION - PRCO A .....	81
FK0641 DESIGNATION - FORTY ONE .....	84



The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0476 \*\*\*\*\*

### FK0476 DESIGNATION - F 105

FK0476 PID - FK0476

FK0476 STATE/COUNTY- OK/ROGER MILLS

FK0476 USGS QUAD - CHEYENNE (1989)

FK0476

FK0476 \*CURRENT SURVEY CONTROL

FK0476

FK0476\* NAD 83(1986)- 35 36 31. (N) 099 40 19. (W) SCALED

FK0476\* NAVD 88 - 601.792 (meters) 1974.38 (feet) ADJUSTED

FK0476

FK0476 GEOID HEIGHT- -27.76 (meters) GEOID09

FK0476 DYNAMIC HT - 601.164 (meters) 1972.32 (feet) COMP

FK0476 MODELED GRAV- 979,572.3 (mgal) NAVD 88

FK0476

FK0476 VERT ORDER - SECOND CLASS 0

FK0476

FK0476.The horizontal coordinates were scaled from a topographic map and have

FK0476.an estimated accuracy of +/- 6 seconds.

FK0476

FK0476.The orthometric height was determined by differential leveling and

FK0476.adjusted in June 1991.

FK0476

FK0476.The geoid height was determined by GEOID09.

FK0476

FK0476.The dynamic height is computed by dividing the NAVD 88

FK0476.geopotential number by the normal gravity value computed on the

FK0476.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0476.degrees latitude (g = 980.6199 gals.).

FK0476

FK0476.The modeled gravity was interpolated from observed gravity values.

FK0476

FK0476; North East Units Estimated Accuracy

FK0476;SPC OK N - 68,830. 448,520. MT (+/- 180 meters Scaled)

FK0476

FK0476 SUPERSEDED SURVEY CONTROL

FK0476

FK0476 NGVD 29 (??/??/92) 601.514 (m) 1973.47 (f) ADJ UNCH 2 0

FK0476

FK0476.Superseded values are not recommended for survey control.

FK0476.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0476.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0476

FK0476\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME391407(NAD 83)

FK0476\_MARKER: DB = BENCH MARK DISK

FK0476\_SETTING: 36 = SET IN A MASSIVE STRUCTURE

FK0476\_SP\_SET: BRIDGE

FK0476\_STAMPING: F-105 1934

FK0476\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

FK0476

FK0476 HISTORY - Date Condition Report By  
FK0476 HISTORY - 1934 MONUMENTED CGS  
FK0476

FK0476 STATION DESCRIPTION  
FK0476

FK0476 DESCRIBED BY COAST AND GEODETIC SURVEY 1934

FK0476 0.7 MI S FROM CHEYENNE.

FK0476 0.7 MILES SOUTH OF P. AND SF. RR. STATION AT CHEYENNE 24 FEET

FK0476 WEST OF CENTER LINE OF U.S. HIGHWAY 283, ON NORTH WEST WINGWALL

FK0476 OF CONCRETE BRIDGE.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0637 \*\*\*\*\*

FK0637 FBN - This is a Federal Base Network Control Station.

**FK0637 DESIGNATION - 57 WHV**

FK0637 PID - FK0637

FK0637 STATE/COUNTY- OK/ROGER MILLS

FK0637 USGS QUAD - REYDON (1989)

FK0637

FK0637 \*CURRENT SURVEY CONTROL

FK0637

FK0637\* NAD 83(2007)- 35 44 27.35460(N) 099 58 52.50301(W) ADJUSTED

FK0637\* NAVD 88 - 712.5 (meters) 2338. (feet) GPS OBS

FK0637

FK0637 EPOCH DATE - 2002.00

FK0637 X - -898,417.102 (meters) COMP

FK0637 Y - -5,104,944.531 (meters) COMP

FK0637 Z - 3,705,297.872 (meters) COMP

FK0637 LAPLACE CORR- -0.45 (seconds) DEFLEC09

FK0637 ELLIP HEIGHT- 684.396 (meters) (02/10/07) ADJUSTED

FK0637 GEOID HEIGHT- -28.11 (meters) GEOID09

FK0637

FK0637 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FK0637 Type PID Designation North East Ellip

FK0637 -----

FK0637 NETWORK FK0637 57 WHV 0.43 0.33 0.98

FK0637 -----

FK0637

FK0637.The horizontal coordinates were established by GPS observations

FK0637.and adjusted by the National Geodetic Survey in February 2007.

FK0637

FK0637.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FK0637.See [National Readjustment](#) for more information.

FK0637.The horizontal coordinates are valid at the epoch date displayed above.

FK0637.The epoch date for horizontal control is a decimal equivalence

FK0637.of Year/Month/Day.

FK0637

FK0637.The orthometric height was determined by GPS observations and a

FK0637.high-resolution geoid model.

FK0637

FK0637.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0637

FK0637.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0637

FK0637.The ellipsoidal height was determined by GPS observations

FK0637.and is referenced to NAD 83.

FK0637

FK0637.The geoid height was determined by GEOID09.

FK0637

FK0637; North East Units Scale Factor Converg.

FK0637;SPC OK N - 84,036.956 420,797.970 MT 0.99997294 -1 10 09.2

FK0637;SPC OK N - 275,711.25 1,380,568.01 sFT 0.99997294 -1 10 09.2

FK0637;UTM 14 - 3,955,658.455 411,272.459 MT 0.99969701 -0 34 23.5

FK0637

FK0637! - Elev Factor x Scale Factor = Combined Factor

FK0637!SPC OK N - 0.99989259 x 0.99997294 = 0.99986554

FK0637!UTM 14 - 0.99989259 x 0.99969701 = 0.99958964

FK0637

FK0637 SUPERSEDED SURVEY CONTROL

FK0637

FK0637 ELLIP H (06/09/00) 684.388 (m) GP( ) 2 2

FK0637 NAD 83(1993)- 35 44 27.35438(N) 099 58 52.50250(W) AD( ) B

FK0637 ELLIP H (05/09/94) 684.417 (m) GP( ) 4 2

FK0637

FK0637.Superseded values are not recommended for survey control.

FK0637.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0637.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0637

FK0637\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME1127255658(NAD 83)

FK0637\_MARKER: DB = BENCH MARK DISK

FK0637\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0637\_SP\_SET: SQUARE CONCRETE MONUMENT

FK0637\_STAMPING: 57 WHV 1959 2337

FK0637\_MARK LOGO: USGS

FK0637\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0637\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0637+STABILITY: SURFACE MOTION

FK0637\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0637+SATELLITE: SATELLITE OBSERVATIONS - August 19, 1999

FK0637

FK0637 HISTORY - Date Condition Report By

FK0637 HISTORY - UNK MONUMENTED

FK0637 HISTORY - 19930517 GOOD NGS

FK0637 HISTORY - 19990819 GOOD NGS

FK0637

FK0637 STATION DESCRIPTION

FK0637

FK0637'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

FK0637'STATION IS LOCATED ABOUT 11 KM (6.85 MI) NORTHWEST OF REYDON, 2 KM

FK0637'(1.25 MI) SOUTH OF THE WASHITA RIVER, 2 KM (1.25 MI) EAST OF THE

FK0637'OKLAHOMA-TEXAS STATE LINE, ALONG A PAVED ROAD, AT THE NORTH EDGE OF

A

FK0637'CULTIVATED FIELD, ON THE RIGHT-OF-WAY (FENCE IS IN THE WRONG PLACE),

FK0637'IN THE NORTHEAST 1/4 OF SECTION 32, T 15 N, R 26 W.

FK0637'OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.

FK0637'TO REACH FROM THE CROSSROAD AT THE JUNCTION OF STATE HIGHWAYS 30

AND

FK0637'47 ON THE WEST SIDE OF REYDON, GO NORTH ON HIGHWAY 30 FOR 9.97 KM

FK0637'(6.20 MI) TO A CROSSROAD. TURN LEFT, WEST, ON PAVED ROAD (EW 88) FOR

FK0637'4.90 KM (3.05 MI) TO A DIRT CROSSROAD AT FRAME HOUSE ON THE RIGHT.

FK0637'CONTINUE AHEAD FOR 0.17 KM (0.10 MI) TO THE STATION ON THE LEFT ON

FK0637'TOP OF A VERY SLIGHT RISE.

FK0637'STATION MARK IS SET IN THE TOP OF A 20-CM SQUARE CONCRETE POST

FK0637'PROJECTING 10 CM ABOVE GROUND. IT IS 8.8 M (28.9 FT) SOUTH OF, AND 1

FK0637'M (3.3 FT) HIGHER THAN THE ROAD CENTER, 0.8 M (2.6 FT) SOUTH OF A

FK0637'WIRE FENCE, 1.0 M (3.3 FT) WEST OF A METAL WITNESS POST, AND 0.5 M

FK0637'(1.6 FT) EAST OF A FIBERGLASS WITNESS POST.

FK0637

FK0637 STATION RECOVERY (1999)  
FK0637  
FK0637 RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (CSM)  
FK0637 THE STATION IS LOCATED ABOUT 11 KM (6.85 MI) NORTHWEST OF REYDON, 2 KM  
FK0637 (1.25 MI) SOUTH OF THE WASHITA RIVER, 2 KM (1.25 MI) EAST OF THE  
FK0637 OKLAHOMA-TEXAS STATE LINE, ALONG A PAVED ROAD, AT THE NORTH EDGE OF  
A  
FK0637 CULTIVATED FIELD, ON THE RIGHT-OF-WAY (FENCE IS IN THE WRONG PLACE),  
FK0637 IN THE NORTHEAST 1/4 OF SECTION 32, T 15 N, R 26 W.  
FK0637 OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION. TO REACH FROM  
THE  
FK0637 CROSSROAD AT THE JUNCTION OF STATE HIGHWAYS 30 AND 47 ON THE WEST  
SIDE  
FK0637 OF REYDON, GO NORTH ON HIGHWAY 30 FOR 9.97 KM (6.20 MI) TO A  
FK0637 CROSSROAD. TURN LEFT, WEST, ON PAVED ROAD (EW 88) FOR 4.90 KM (3.05  
FK0637 MI) TO A DIRT CROSSROAD AT A FRAME HOUSE ON THE RIGHT. CONTINUE AHEAD  
FK0637 FOR 0.17 KM (0.10 MI) TO THE STATION ON THE LEFT, ON TOP OF A VERY  
FK0637 SLIGHT RISE. STATION IS SET IN THE TOP OF A 20 CM SQUARE CONCRETE  
FK0637 POST PROJECTING 10 CM ABOVE GROUND. IT IS 9.63 M (31.59 FT) SOUTH OF,  
FK0637 AND 1.0 M (3.3 FT) HIGHER THAN THE ROAD CENTER, 0.8 M (2.6 FT) SOUTH  
FK0637 OF AN ABANDONED WIRE FENCE, 0.98 M (3.22 FT) EAST-NORTHEAST OF AN  
FK0637 OKDOT METAL WITNESS POST, 0.91 M (2.99 FT) WEST OF AN OKDOT METAL  
FK0637 WITNESS POST, 0.88 M (2.89 FT) SOUTH OF AN OKDOT METAL WITNESS POST  
FK0637 AND 0.55 M (1.80 FT) EAST OF A FIBERGLASS WITNESS POST.

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The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EM1085 \*\*\*\*\*

EM1085 CBN - This is a Cooperative Base Network Control Station.

## EM1085 DESIGNATION - 21 K 35

EM1085 PID - EM1085

EM1085 STATE/COUNTY- OK/KIOWA

EM1085 USGS QUAD - RAINY MTN CREEK (1991)

EM1085

EM1085 \*CURRENT SURVEY CONTROL

EM1085

EM1085\* NAD 83(2007)- 34 53 57.10476(N) 098 57 41.58239(W) ADJUSTED

EM1085\* NAVD 88 - 483.2 (meters) 1585. (feet) GPS OBS

EM1085

EM1085 EPOCH DATE - 2002.00

EM1085 X - -815,808.480 (meters) COMP

EM1085 Y - -5,173,278.430 (meters) COMP

EM1085 Z - 3,628,962.374 (meters) COMP

EM1085 LAPLACE CORR- 0.60 (seconds) DEFLEC09

EM1085 ELLIP HEIGHT- 457.642 (meters) (02/10/07) ADJUSTED

EM1085 GEOID HEIGHT- -25.52 (meters) GEOID09

EM1085

EM1085 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EM1085 Type PID Designation North East Ellip

EM1085 -----

EM1085 NETWORK EM1085 21 K 35 1.25 1.10 2.90

EM1085 -----

EM1085

EM1085.The horizontal coordinates were established by GPS observations

EM1085.and adjusted by the National Geodetic Survey in February 2007.

EM1085

EM1085.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EM1085.See [National Readjustment](#) for more information.

EM1085.The horizontal coordinates are valid at the epoch date displayed above.

EM1085.The epoch date for horizontal control is a decimal equivalence

EM1085.of Year/Month/Day.

EM1085

EM1085.The orthometric height was determined by GPS observations and a

EM1085.high-resolution geoid model.

EM1085

EM1085.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EM1085

EM1085.The Laplace correction was computed from DEFLEC09 derived deflections.

EM1085

EM1085.The ellipsoidal height was determined by GPS observations

EM1085.and is referenced to NAD 83.

EM1085

EM1085.The geoid height was determined by GEOID09.

EM1085

EM1085; North East Units Scale Factor Converg.

EM1085;SPC OK S - 174,111.079 512,119.922 MT 0.99995101 -0 32 44.9

EM1085;SPC OK S - 571,229.43 1,680,180.11 sFT 0.99995101 -0 32 44.9

EM1085;UTM 14 - 3,861,865.026 503,512.863 MT 0.99960015 +0 01 19.2

EM1085

EM1085! - Elev Factor x Scale Factor = Combined Factor

EM1085!SPC OK S - 0.99992817 x 0.99995101 = 0.99987918

EM1085!UTM 14 - 0.99992817 x 0.99960015 = 0.99952835

EM1085

EM1085 SUPERSEDED SURVEY CONTROL

EM1085

EM1085 ELLIP H (04/16/01) 457.655 (m) GP( ) 4 2

EM1085 NAD 83(1993)- 34 53 57.10475(N) 098 57 41.58216(W) AD( ) B

EM1085 ELLIP H (05/09/94) 457.694 (m) GP( ) 4 2

EM1085

EM1085.Superseded values are not recommended for survey control.

EM1085.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EM1085.[See file dsdata.txt](#) to determine how the superseded data were derived.

EM1085

EM1085\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SND0351261865(NAD 83)

EM1085\_MARKER: DB = BENCH MARK DISK

EM1085\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

EM1085\_SP\_SET: SQUARE CONCRETE MONUMENT

EM1085\_STAMPING: NO. 21 K 35 TT 1935

EM1085\_MARK LOGO: CGS

EM1085\_MAGNETIC: N = NO MAGNETIC MATERIAL

EM1085\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

EM1085+STABILITY: SURFACE MOTION

EM1085\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EM1085+SATELLITE: SATELLITE OBSERVATIONS - April 07, 1993

EM1085

EM1085 HISTORY - Date Condition Report By

EM1085 HISTORY - UNK MONUMENTED

EM1085 HISTORY - 19930407 GOOD NGS

EM1085

EM1085 STATION DESCRIPTION

EM1085

EM1085'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

EM1085'STATION IS LOCATED ABOUT 27 KM (16.75 MI) NORTH OF SNYDER, 8 KM

EM1085'(4.95 MI) NORTHEAST OF ROOSEVELT, ALONG A PAVED ROAD, JUST WEST OF A

EM1085'SERIES OF ROAD CURVES, IN A PASTURE WITH MESQUITE TREES, ACROSS ROAD

EM1085'FROM A ROCK-COVERED HILL, IN THE NORTHEAST 1/4 OF SECTION 14, T 5 N,

EM1085'R 17 W. OWNERSHIP--LEON JONES, 326 WICHITA STREET, PO BOX 6,

EM1085'ROOSEVELT, OK 73564. PHONE IS 405-639-2477.

EM1085'TO REACH FROM THE JUNCTION OF US HIGHWAY 183 AND STATE HIGHWAY 19 AT

EM1085'ROOSEVELT, GO NORTHWEST ON HIGHWAY 183 FOR 5.20 KM (3.25 MI) TO A

EM1085'CROSSROAD. TURN RIGHT, EAST, ON PAVED ROAD FOR 6.36 KM (3.95 MI) TO

EM1085'A DIRT CROSSROAD. CONTINUE AHEAD FOR 0.98 KM (0.60 MI) TO THE

EM1085'STATION ON THE RIGHT AT A FIELD ENTRANCE, 0.17 KM (0.10 MI) BEFORE

EM1085'REACHING A ROAD CURVE.

EM1085'STATION MARK IS A USCGS AND STATE SURVEY DISK SET IN THE TOP OF A

EM1085'15-CM SQUARE CONCRETE POST PROJECTING 12 CM ABOVE GROUND. IT IS 19.5

EM1085'M (64.0 FT) SOUTH OF, AND LEVEL WITH, THE ROAD CENTER, 10.2 M

EM1085'(33.5 FT) SOUTH OF THE PASTURE FENCE, 0.9 M (3.0 FT) NORTH OF A METAL

EM1085'WITNESS POST, 1.2 M (3.9 FT) EAST OF A METAL WITNESS POST, AND 35.4 M

EM1085'(116.1 FT) WEST-SOUTHWEST OF THE WEST GATEPOST AT FIELD ENTRANCE.

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0076 \*\*\*\*\*

### FK0076 DESIGNATION - Q 31

FK0076 PID - FK0076

FK0076 STATE/COUNTY- OK/CADDO

FK0076 USGS QUAD - FORT COBB (1979)

FK0076

FK0076 \*CURRENT SURVEY CONTROL

FK0076

FK0076\* NAD 83(1986)- 35 05 43. (N) 098 26 13. (W) SCALED

FK0076\* NAVD 88 - 382.624 (meters) 1255.33 (feet) ADJUSTED

FK0076

FK0076 GEOID HEIGHT- -26.83 (meters) GEOID09

FK0076 DYNAMIC HT - 382.228 (meters) 1254.03 (feet) COMP

FK0076 MODELED GRAV- 979,589.8 (mgal) NAVD 88

FK0076

FK0076 VERT ORDER - SECOND CLASS 0

FK0076

FK0076.The horizontal coordinates were scaled from a topographic map and have

FK0076.an estimated accuracy of +/- 6 seconds.

FK0076

FK0076.The orthometric height was determined by differential leveling and

FK0076.adjusted in June 1991.

FK0076

FK0076.The geoid height was determined by GEOID09.

FK0076

FK0076.The dynamic height is computed by dividing the NAVD 88

FK0076.geopotential number by the normal gravity value computed on the

FK0076.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0076.degrees latitude (g = 980.6199 gals.).

FK0076

FK0076.The modeled gravity was interpolated from observed gravity values.

FK0076

FK0076; North East Units Estimated Accuracy

FK0076;SPC OK S - 195,530. 560,160. MT (+/- 180 meters Scaled)

FK0076

FK0076 SUPERSEDED SURVEY CONTROL

FK0076

FK0076 NGVD 29 (??/??/92) 382.471 (m) 1254.82 (f) ADJ UNCH 2 0

FK0076

FK0076.Superseded values are not recommended for survey control.

FK0076.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0076.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0076

FK0076\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SND513837(NAD 83)

FK0076\_MARKER: DB = BENCH MARK DISK

FK0076\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0076\_SP\_SET: SET IN TOP OF CONCRETE MONUMENT

FK0076\_STAMPING: Q 31 1934

FK0076\_MARK LOGO: CGS

FK0076\_MAGNETIC: N = NO MAGNETIC MATERIAL



FK0076\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0076+STABILITY: SURFACE MOTION

FK0076

FK0076 HISTORY	- Date	Condition	Report By
FK0076 HISTORY	- 1934	MONUMENTED	CGS
FK0076 HISTORY	- 1963	GOOD	NGS
FK0076 HISTORY	- 19960205	GOOD	OKDOT

FK0076

FK0076 STATION DESCRIPTION

FK0076

FK0076'DESCRIBED BY NATIONAL GEODETIC SURVEY 1963

FK0076'AT FORT COBB.

FK0076'AT FORT COBB, CADDO COUNTY, ON THE CHICAGO, ROCK ISLAND AND

FK0076'PACIFIC RAILROAD, SOUTHEAST OF THE STATION, AT THE CROSSING

FK0076'OF STATE HIGHWAY 9, 44.0 FEET SOUTH OF THE SOUTH RAIL OF THE

FK0076'MAIN LINE, 43.5 FEET WEST OF THE CENTER OF STATE HIGHWAY 9 AND

FK0076'16.0 FEET SOUTHWEST OF A TELEPHONE POLE. A STANDARD DISK,

FK0076'STAMPED Q 31 1934 AND SET IN THE TOP OF A CONCRETE POST FLUSH

FK0076'WITH THE TOP OF THE GROUND.

FK0076

FK0076 STATION RECOVERY (1996)

FK0076

FK0076'RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 1996 (LDR)

FK0076'IN FORT COBB, FROM THE JUNCTION OF SH 9 (MAIN STREET) , AND HAZLETT

FK0076'STREET, GO 0.22 KM (0.15 MI) SOUTH ON SH 9 (MAIN STREET) TO THE MARK

FK0076'ON THE RIGHT. IT IS 13.2 M (43.3 FT) WEST OF THE CENTERLINE OF SH 9,

FK0076'3.0 M (9.8 FT) NORTH OF A FENCE WEST, 0.8 M (2.6 FT) WEST OF A FENCE

FK0076'SOUTH, 0.4 M (1.3 FT) SOUTH OF A STEEL WITNESS POST, MARK IS FLUSH

FK0076'WITH THE GROUND.

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The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL0535 \*\*\*\*\*

## EL0535 DESIGNATION - X 42

EL0535 PID - EL0535

EL0535 STATE/COUNTY- OK/STEPHENS

EL0535 USGS QUAD - MARLOW (1981)

EL0535

EL0535 \*CURRENT SURVEY CONTROL

EL0535

EL0535\* NAD 83(2007)- 34 40 02.77982(N) 097 57 10.86783(W) ADJUSTED

EL0535\* NAVD 88 - 402.248 (meters) 1319.71 (feet) ADJUSTED

EL0535

EL0535 EPOCH DATE - 2002.00

EL0535 X - -726,645.945 (meters) COMP

EL0535 Y - -5,201,297.008 (meters) COMP

EL0535 Z - 3,607,798.255 (meters) COMP

EL0535 LAPLACE CORR- 1.28 (seconds) DEFLEC09

EL0535 ELLIP HEIGHT- 376.199 (meters) (02/10/07) ADJUSTED

EL0535 GEOID HEIGHT- -26.05 (meters) GEOID09

EL0535 DYNAMIC HT - 401.829 (meters) 1318.33 (feet) COMP

EL0535

EL0535 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL0535 Type PID Designation North East Ellip

EL0535 -----

EL0535 NETWORK EL0535 X 42 4.63 4.51 6.57

EL0535 -----

EL0535 MODELED GRAV- 979,579.7 (mgal) NAVD 88

EL0535

EL0535 VERT ORDER - FIRST CLASS II

EL0535

EL0535.The horizontal coordinates were established by GPS observations

EL0535.and adjusted by the National Geodetic Survey in February 2007.

EL0535

EL0535.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL0535.See [National Readjustment](#) for more information.

EL0535.The horizontal coordinates are valid at the epoch date displayed above.

EL0535.The epoch date for horizontal control is a decimal equivalence

EL0535.of Year/Month/Day.

EL0535

EL0535.The orthometric height was determined by differential leveling and

EL0535.adjusted in June 1991.

EL0535

EL0535.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL0535

EL0535.The Laplace correction was computed from DEFLEC09 derived deflections.

EL0535

EL0535.The ellipsoidal height was determined by GPS observations

EL0535.and is referenced to NAD 83.

EL0535

EL0535.The geoid height was determined by GEOID09.

EL0535

EL0535.The dynamic height is computed by dividing the NAVD 88  
 EL0535.geopotential number by the normal gravity value computed on the  
 EL0535.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
 EL0535.degrees latitude (g = 980.6199 gals.).

EL0535

EL0535.The modeled gravity was interpolated from observed gravity values.

EL0535

EL0535;                    North      East      Units Scale Factor Converg.  
 EL0535;SPC OK S    - 147,984.657 604,305.832 MT 0.99993699 +0 01 36.0  
 EL0535;SPC OK S    - 485,513.00 1,982,626.72 sFT 0.99993699 +0 01 36.0  
 EL0535;UTM 14    - 3,836,662.868 595,925.589 MT 0.99971341 +0 35 44.1

EL0535

EL0535!                - Elev Factor x Scale Factor = Combined Factor

EL0535!SPC OK S    - 0.99994095 x 0.99993699 = 0.99987794

EL0535!UTM 14    - 0.99994095 x 0.99971341 = 0.99965438

EL0535

EL0535                                    SUPERSEDED SURVEY CONTROL

EL0535

EL0535 ELLIP H (06/19/02) 376.220 (m)                    GP(    ) 5 1  
 EL0535 NAD 83(1993)- 34 40 02.77998(N) 097 57 10.86732(W) AD(    ) 1  
 EL0535 ELLIP H (11/28/94) 376.262 (m)                    GP(    ) 5 1  
 EL0535 NAD 83(1986)- 34 40 02.78495(N) 097 57 10.85230(W) AD(    ) 1  
 EL0535 NGVD 29 (??/??/92) 402.127 (m)                1319.31 (f) ADJ UNCH 1 2

EL0535

EL0535.Superseded values are not recommended for survey control.

EL0535.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL0535.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL0535

EL0535\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SND9592536662(NAD 83)

EL0535\_MARKER: DB = BENCH MARK DISK

EL0535\_SETTING: 32 = SET IN A RETAINING WALL OR CONCRETE LEDGE

EL0535\_SP\_SET: HEADWALL

EL0535\_STAMPING: X 42 1934

EL0535\_MARK LOGO: CGS

EL0535\_MAGNETIC: N = NO MAGNETIC MATERIAL

EL0535\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

EL0535+STABILITY: SURFACE MOTION

EL0535\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL0535+SATELLITE: SATELLITE OBSERVATIONS - 1988

EL0535

EL0535 HISTORY	- Date	Condition	Report By
EL0535 HISTORY	- 1934	MONUMENTED	CGS
EL0535 HISTORY	- 1934	GOOD	NGS
EL0535 HISTORY	- 1963	GOOD	NGS
EL0535 HISTORY	- 1986	GOOD	NGS
EL0535 HISTORY	- 1988	GOOD	NGS

EL0535

EL0535                                    STATION DESCRIPTION

EL0535

EL0535'DESCRIBED BY NATIONAL GEODETIC SURVEY 1934

EL0535'1.8 MI N FROM MARLOW.

EL0535'1.8 MILES NORTH OF C.R.I. AND P.RR. STATION AT MARLOW 0.2 MILE

EL0535'SOUTH OF MILEPOST 464. 115 FEET NORTH OF SECTION LINE ROAD.

EL0535'SOUTHWEST CORNER OF CULVERT UNDER CHICAGO, ROCK ISLAND AND

EL0535'PACIFIC RAILROAD.

EL0535

EL0535 STATION RECOVERY (1963)  
EL0535  
EL0535'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1963  
EL0535'RECOVERED IN GOOD CONDITION.  
EL0535  
EL0535 STATION RECOVERY (1986)  
EL0535  
EL0535'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1986  
EL0535'RECOVERED IN GOOD CONDITION. A NEW TO REACH FOLLOWS. 20.9 KM (13.0  
EL0535'MI) NORTHERLY ALONG U.S. HIGHWAY 81 FROM ITS JUNCTION WITH PATE STREET  
EL0535'AND OLD U.S. HIGHWAY 81 (13TH STREET) IN DUNCAN, THENCE 0.5 KM (0.3  
EL0535'MI) EAST ALONG BALLPARK ROAD.  
EL0535  
EL0535 STATION RECOVERY (1988)  
EL0535  
EL0535'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1988 (LDA)  
EL0535'THE STATION IS LOCATED ABOUT 2.3 KM (1.4 MI)  
EL0535'NORTHEAST OF MARLOW, 0.5 KM (0.3 MI) EAST OF US HIGHWAY 81 AND JUST  
EL0535'WEST OF RAILROAD TRACKS.  
EL0535'OWNERSHIP--BURLINGTON NORTHERN RAILROAD, 503 10TH STREET, WICHITA  
EL0535'FALLS. TX 76301, PHONE 817-322-3671.  
EL0535'  
EL0535'TO REACH THE STATION FROM THE JUNCTION OF US HIGHWAY 81 AND STATE  
EL0535'HIGHWAY 29 IN MARLOW, GO NORTH ON US HIGHWAY 81 FOR 2.3 KM (1.4 MI)  
EL0535'TO A PAVED CROSSROAD JUST PAST A BALL PARK. TURN RIGHT AND GO EAST  
EL0535'FOR 0.5 KM (0.3 MI) TO THE MARK ON THE LEFT JUST WEST OF TRACK IN  
EL0535'CONCRETE HEADWALL.  
EL0535'  
EL0535'THE STATION IS A STANDARD CGS BENCH MARK DISK STAMPED---X 42  
EL0535'1934---, SET IN A DRILL IN CONCRETE HEADWALL WHICH IS ON THE WEST  
EL0535'SIDE OF TRACKS AND ABOUT 1.0 METERS (3.3 FT) LOWER THAN THE TRACKS.  
EL0535'LOCATED 31.5 METERS (103.5 FT) NORTH FROM CENTER OF PAVED ROAD, 6.0  
EL0535'METERS (19.6 FT) EAST FROM FENCELINE, 4.5 METERS (14.8 FT) WEST  
EL0535'FROM WEST RAIL OF TRACKS, 0.3 METER (1.0 FT) EAST FROM WEST EDGE OF  
EL0535'HEADWALL AND 0.3 METER (1.0 FT) NORTH FROM SOUTH EDGE OF HEADWALL.  
EL0535'  
EL0535'GPS SURVEY, FORT SILL, OKLAHOMA.  
EL0535'  
EL0535'THIS STATION IS NOT A VERY GOOD GPS STATION DUE TO OBSTRUCTIONS  
EL0535'CAUSED BY TREES TO THE NORTHWEST AND SOUTHWEST.  
EL0535'  
EL0535'DESCRIBED BY D.A. BOWLING.

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The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL1055 \*\*\*\*\*

EL1055 CBN - This is a Cooperative Base Network Control Station.

**EL1055 DESIGNATION - STEALY**

EL1055 PID - EL1055

EL1055 STATE/COUNTY- OK/MCCLAIN

EL1055 USGS QUAD - STEALY (1980)

EL1055

EL1055 \*CURRENT SURVEY CONTROL

EL1055

EL1055\* NAD 83(2007)- 34 57 50.53239(N) 097 23 23.99889(W) ADJUSTED

EL1055\* NAVD 88 - 358.048 (meters) 1174.70 (feet) ADJUSTED

EL1055

EL1055 EPOCH DATE - 2002.00

EL1055 X - -673,079.838 (meters) COMP

EL1055 Y - -5,189,519.205 (meters) COMP

EL1055 Z - 3,634,788.229 (meters) COMP

EL1055 LAPLACE CORR- 0.34 (seconds) DEFLEC09

EL1055 ELLIP HEIGHT- 332.014 (meters) (02/10/07) ADJUSTED

EL1055 GEOID HEIGHT- -26.04 (meters) GEOID09

EL1055 DYNAMIC HT - 357.699 (meters) 1173.55 (feet) COMP

EL1055

EL1055 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL1055 Type PID Designation North East Ellip

EL1055 -----

EL1055 NETWORK EL1055 STEALY 0.61 0.49 2.88

EL1055 -----

EL1055 MODELED GRAV- 979,649.2 (mgal) NAVD 88

EL1055

EL1055 VERT ORDER - SECOND CLASS I

EL1055

EL1055.The horizontal coordinates were established by GPS observations

EL1055.and adjusted by the National Geodetic Survey in February 2007.

EL1055

EL1055.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL1055.See [National Readjustment](#) for more information.

EL1055.The horizontal coordinates are valid at the epoch date displayed above.

EL1055.The epoch date for horizontal control is a decimal equivalence

EL1055.of Year/Month/Day.

EL1055

EL1055.The orthometric height was determined by differential leveling and

EL1055.adjusted in July 2002.

EL1055.WARNING-GPS observations at this control monument resulted in a GPS

EL1055.derived orthometric height which differed from the leveled height by

EL1055.more than one decimeter (0.1 meter).

EL1055

EL1055.[Photographs](#) are available for this station.

EL1055

EL1055.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL1055

EL1055.The Laplace correction was computed from DEFLEC09 derived deflections.

EL1055

EL1055.The ellipsoidal height was determined by GPS observations  
EL1055.and is referenced to NAD 83.

EL1055

EL1055.The geoid height was determined by GEOID09.

EL1055

EL1055.The dynamic height is computed by dividing the NAVD 88  
EL1055.geopotential number by the normal gravity value computed on the  
EL1055.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
EL1055.degrees latitude (g = 980.6199 gals.).

EL1055

EL1055.The modeled gravity was interpolated from observed gravity values.

EL1055

EL1055;	North	East	Units	Scale Factor	Converg.
EL1055;SPC OK S	- 181,053.922	655,707.477	MT	0.99995785	+0 20 46.5
EL1055;SPC OK S	- 594,007.74	2,151,266.95	sFT	0.99995785	+0 20 46.5
EL1055;UTM 14	- 3,870,238.530	646,986.138	MT	0.99986628	+0 55 22.1

EL1055

EL1055! - Elev Factor x Scale Factor = Combined Factor

EL1055!SPC OK S - 0.99994789 x 0.99995785 = 0.99990574

EL1055!UTM 14 - 0.99994789 x 0.99986628 = 0.99981417

EL1055

EL1055 SUPERSEDED SURVEY CONTROL

EL1055

EL1055	ELLIP H (02/05/01)	332.046 (m)	GP( ) 2 2
EL1055	NAD 83(1993)-	34 57 50.53180(N)	097 23 23.99879(W) AD( ) B
EL1055	ELLIP H (05/09/94)	332.073 (m)	GP( ) 4 2
EL1055	NAVD 88 (07/24/98)	358.05 (m)	1174.7 (f) LEVELING 3

EL1055

EL1055.Superseded values are not recommended for survey control.

EL1055.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL1055.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL1055

EL1055\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPD4698670238(NAD 83)

EL1055\_MARKER: 1 = METAL ROD

EL1055\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

EL1055\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

EL1055\_STAMPING: STEALY 1993

EL1055\_MARK LOGO: NGS

EL1055\_PROJECTION: FLUSH

EL1055\_MAGNETIC: I = MARKER IS A STEEL ROD

EL1055\_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD

EL1055+STABILITY: POSITION/ELEVATION WELL

EL1055\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL1055+SATELLITE: SATELLITE OBSERVATIONS - October 25, 2002

EL1055\_ROD/PIPE-DEPTH: 3.7 meters

EL1055\_SLEEVE-DEPTH : 0.9 meters

EL1055

EL1055	HISTORY	- Date	Condition	Report By
EL1055	HISTORY	- 1993	MONUMENTED	NGS
EL1055	HISTORY	- 19970429	GOOD	NGS
EL1055	HISTORY	- 19970509	GOOD	NGS
EL1055	HISTORY	- 20021004	GOOD	OKDOT
EL1055	HISTORY	- 20021025	GOOD	JCLS

EL1055

EL1055 STATION DESCRIPTION

EL1055

EL1055'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

EL1055'NOTE--STATION SITE IS NEAR A FIBER OPTIC CABLE LINE. IF IN DOUBT,

EL1055'CALL 1-800-522-6543. SITE SELECTED SHOULD BE CLEAR.

EL1055'STATION IS LOCATED ABOUT 4 KM (2.50 MI) SOUTHWEST OF PURCELL, 4 KM  
EL1055'(2.50 MI) SOUTH OF THE SOUTHWEST CORNER OF PURCELL LAKE, ALONG STATE  
EL1055'HIGHWAY 74, ON THE RIGHT-OF-WAY, IN A MOWED AREA ALONG A BOARD FENCE  
EL1055'TO A HORSE PASTURE, IN EAST CENTRAL SECTION 27, T 6 N, R 2 W.

EL1055'OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.

EL1055'TO REACH FROM THE OVERPASS AT THE JUNCTION OF INTERSTATE HIGHWAY 35  
EL1055'AND STATE HIGHWAY 74 (EXIT 91) JUST SOUTH OF PURCELL, GO SOUTHWEST ON  
EL1055'HIGHWAY 74 FOR 2.45 KM (1.50 MI) TO A SLANTED CROSSROAD. CONTINUE  
EL1055'AWARD FOR 0.24 KM (0.15 MI) TO LEVEL GROUND AND THE STATION ON THE  
EL1055'RIGHT JUST PAST A TELEPHONE RELAY BUILDING.

EL1055'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN  
EL1055'GREASE FILLED SLEEVE 90 CM LONG ENCASED IN A 12.7 CM PVC PIPE WITH  
EL1055'LOGO CAP SURROUNDED BY CONCRETE SET 1 CM BELOW GROUND. IT IS 13.9 M  
EL1055'(45.6 FT) NORTHWEST OF, AND SLIGHTLY LOWER THAN THE HIGHWAY CENTER,  
EL1055'3.3 M (10.8 FT) SOUTHEAST OF A FIBERGLASS WITNESS POST IN THE BOARD  
EL1055'FENCE, 21.0 M (68.9 FT) SOUTHWEST OF A UTILITY POLE WITH A  
EL1055'TRANSFORMER AND GUY WIRE, 30.7 M (100.7 FT) SOUTHWEST OF A FENCE  
EL1055'CORNER, AND 32.5 M (106.6 FT) SOUTHWEST OF THE SOUTH CORNER OF THE  
EL1055'CONCRETE TELEPHONE BUILDING.

EL1055

EL1055 STATION RECOVERY (1997)

EL1055

EL1055'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1997 (GAS)

EL1055'2.7 KM (1.65 MI) SOUTHWESTERLY ALONG STATE HIGHWAY 74 FROM THE  
EL1055'JUNCTION OF INTERSTATE HIGHWAY 35 IN PURCELL (EXIT 91) , 32.5 M (106.6  
EL1055'FT) SOUTHWEST OF THE SOUTH CORNER OF A SMALL TELEPHONE BUILDING, 20.9  
EL1055'M (68.6 FT) SOUTHWEST OF A UTILITY POLE WITH A GUY CABLE, 13.9 M (45.6  
EL1055'FT) NORTHWEST OF THE HIGHWAY CENTERLINE, 3.2 M (10.5 FT) SOUTHEAST OF  
EL1055'A WITNESS POST AND FENCE, AND NEAR THE CENTER OF 4 WITNESS POSTS.  
EL1055'NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP. THE  
EL1055'SLEEVE DEPTH DOES NOT MEET THE SPECIFICATIONS FOR A CLASS A MARK.

EL1055

EL1055 STATION RECOVERY (1997)

EL1055

EL1055'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1997 (ALG)

EL1055'THE STATION WAS RECOVERED USING THE 1993 DESCRIPTION WITH ALL  
EL1055'DIRECTIONS AND DISTANCES CHECKING.

EL1055

EL1055 STATION RECOVERY (2002)

EL1055

EL1055'RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 2002 (RET)  
EL1055'RECOVERED IN GOOD CONDITION

EL1055

EL1055 STATION RECOVERY (2002)

EL1055

EL1055'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2002 (MRY)

EL1055'RECOVERED IN GOOD CONDITION.

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL0431 \*\*\*\*\*

**EL0431 DESIGNATION - A 81**

EL0431 PID - EL0431

EL0431 STATE/COUNTY- OK/CARTER

EL0431 USGS QUAD - GENE AUTRY (1978)

EL0431

EL0431 \*CURRENT SURVEY CONTROL

EL0431

EL0431\* NAD 83(1993)- 34 17 59.77060(N) 097 02 17.79046(W) ADJUSTED

EL0431\* NAVD 88 - 232.441 (meters) 762.60 (feet) ADJUSTED

EL0431

EL0431 X - -646,327.917 (meters) COMP

EL0431 Y - -5,235,004.900 (meters) COMP

EL0431 Z - 3,574,096.909 (meters) COMP

EL0431 LAPLACE CORR- 1.28 (seconds) DEFLEC09

EL0431 ELLIP HEIGHT- 207.100 (meters) (11/28/94) ADJUSTED

EL0431 GEOID HEIGHT- -25.67 (meters) GEOID09

EL0431 DYNAMIC HT - 232.206 (meters) 761.83 (feet) COMP

EL0431 MODELED GRAV- 979,618.5 (mgal) NAVD 88

EL0431

EL0431 HORZ ORDER - SECOND

EL0431 VERT ORDER - SECOND CLASS 0

EL0431 ELLP ORDER - FIFTH CLASS I

EL0431

EL0431.The horizontal coordinates were established by GPS observations

EL0431.and adjusted by the National Geodetic Survey in November 1994.

EL0431

EL0431.The orthometric height was determined by differential leveling and

EL0431.adjusted in June 1991.

EL0431

EL0431.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL0431

EL0431.The Laplace correction was computed from DEFLEC09 derived deflections.

EL0431

EL0431.The ellipsoidal height was determined by GPS observations

EL0431.and is referenced to NAD 83.

EL0431

EL0431.The geoid height was determined by GEOID09.

EL0431

EL0431.The dynamic height is computed by dividing the NAVD 88

EL0431.geopotential number by the normal gravity value computed on the

EL0431.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

EL0431.degrees latitude (g = 980.6199 gals.).

EL0431

EL0431.The modeled gravity was interpolated from observed gravity values.

EL0431

EL0431; North East Units Scale Factor Converg.

EL0431;SPC OK S - 107,640.390 688,529.326 MT 0.99994818 +0 32 45.2

EL0431;SPC OK S - 353,150.18 2,258,949.96 sFT 0.99994818 +0 32 45.2

EL0431;UTM 14 - 3,797,155.182 680,534.808 MT 1.00000177 +1 06 20.8



EL0431

EL0431! - Elev Factor x Scale Factor = Combined Factor

EL0431!SPC OK S - 0.99996749 x 0.99994818 = 0.99991567

EL0431!UTM 14 - 0.99996749 x 1.00000177 = 0.99996926

EL0431

EL0431 SUPERSEDED SURVEY CONTROL

EL0431

EL0431 NAD 83(1986)- 34 17 59.77194(N) 097 02 17.77897(W) AD( ) 2

EL0431 NGVD 29 (??/??/92) 232.390 (m) 762.43 (f) ADJ UNCH 2 0

EL0431

EL0431.Superseded values are not recommended for survey control.

EL0431.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL0431.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL0431

EL0431\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPC8053497155(NAD 83)

EL0431\_MARKER: DB = BENCH MARK DISK

EL0431\_SETTING: 34 = SET IN THE FOOTINGS OF SMALL/MEDIUM STRUCTURES

EL0431\_SP\_SET: HEADWALL

EL0431\_STAMPING: A 81 1945

EL0431\_MARK LOGO: CGS

EL0431\_MAGNETIC: N = NO MAGNETIC MATERIAL

EL0431\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

EL0431+STABILITY: SURFACE MOTION

EL0431\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL0431+SATELLITE: SATELLITE OBSERVATIONS - January 26, 2009

EL0431

EL0431 HISTORY - Date Condition Report By

EL0431 HISTORY - 1945 MONUMENTED CGS

EL0431 HISTORY - 19890301 GOOD NGS

EL0431 HISTORY - 20010220 GOOD INDIV

EL0431 HISTORY - 20030625 GOOD ALMLS

EL0431 HISTORY - 20090126 GOOD AIRDAT

EL0431

EL0431 STATION DESCRIPTION

EL0431

EL0431'DESCRIBED BY COAST AND GEODETIC SURVEY 1945

EL0431'1.1 MI N FROM GENE AUTRY.

EL0431'ABOUT 1.1 MILES NORTH ALONG GRAVELED ROAD FROM THE POST OFFICE

EL0431'AT GENE AUTRY, 118.0 FEET NORTHWEST OF GATEHOUSE NO. 2-214 AT

EL0431'THE WEST AND MAIN GATE TO ARDMORE ARMY AIR FIELD, 33.0 FEET

EL0431'NORTH OF THE CENTER LINE OF ASPHALT ROAD AND 38.0 FEET WEST OF

EL0431'THE CENTER LINE OF GRAVELED ROAD. AN IRON DISK STAMPED A 81

EL0431'1945 SET IN A DRILL HOLE ON TOP OF THE EAST END OF THE NORTH

EL0431'CONCRETE HEADWALL OF A TUBE CULVERT.

EL0431

EL0431 STATION RECOVERY (1989)

EL0431

EL0431'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1989

EL0431'THE STATION WAS RECOVERED IN GOOD CONDITION, A COMPLETE DESCRIPTION

EL0431'FOLLOWS.

EL0431'THE STATION IS LOCATED ABOUT 23.6 KM (14.65 MI) SOUTHEAST OF DAVIS,

EL0431'19.5 KM (12.10 MI) NORTHWEST OF MANNSVILLE, AND 16.7 KM (10.40 MI)

EL0431'NORTHEAST OF ARDMORE. OWNERSHIP--STATE HIGHWAY DEPARTMENT.

EL0431'TO REACH THE STATION FROM THE POST OFFICE IN SPRINGER, GO SOUTH ON

EL0431'U.S. HIGHWAY 77 FOR 1.0 KM (0.60 MI) TO A PAVED CROSSROAD. TURN LEFT

EL0431'AND GO EAST ON STATE HIGHWAY 53 FOR 9.8 KM (6.10 MI) TO THE STATION ON

EL0431 THE LEFT JUST BEFORE TURNING SOUTH ON THE HIGHWAY AT THE ENTRANCE TO  
EL0431 THE ARDMORE INDUSTRIAL AIRPARK.

EL0431 THE STATION IS A STANDARD CGS DISK SET IN THE TOP OF THE EAST END OF  
EL0431 THE NORTH HEADWALL OF A 1.2 BY 1.2 METER CONCRETE BOX CULVERT UNDER  
EL0431 THE HIGHWAY AND IS FLUSH WITH THE GROUND. LOCATED 10.7 M (35.1 FT)  
EL0431 NORTH OF THE CENTERLINE OF THE HIGHWAY, 10.6 M (34.8 FT) WEST OF THE  
EL0431 CENTER OF A PAVED ROAD, 0.3 M (1.0 FT) WEST OF THE EAST END OF THE  
EL0431 HEADWALL, AND 1.2 M (3.9 FT) EAST OF A CARSONITE WITNESS POST.

EL0431 DESCRIBED BY E.J. HANSMANN, TYPED BY RLZ.

EL0431

STATION RECOVERY (2001)

EL0431

EL0431

EL0431 RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2001 (DLH)

EL0431 RECOVERED IN GOOD CONDITION.

EL0431

STATION RECOVERY (2003)

EL0431

EL0431 RECOVERY NOTE BY AL MORRIS LAND SURVEYING 2003 (ALM)

EL0431 RECOVERED AS DESCRIBED.

EL0431

STATION RECOVERY (2009)

EL0431

EL0431

EL0431 RECOVERY NOTE BY AERIAL DATA SERVICE INCORPORATED 2009 (JJH)

EL0431 RECOVERED IN GOOD CONDITION.

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL1053 \*\*\*\*\*

EL1053 CBN - This is a Cooperative Base Network Control Station.

## EL1053 DESIGNATION - HOPEWELL

EL1053 PID - EL1053

EL1053 STATE/COUNTY- OK/ATOKA

EL1053 USGS QUAD - CADDO NORTH (1969)

EL1053

EL1053 \*CURRENT SURVEY CONTROL

EL1053

EL1053\* NAD 83(2007)- 34 11 08.72785(N) 096 22 21.35414(W) ADJUSTED

EL1053\* NAVD 88 - 220.5 (meters) 723. (feet) GPS OBS

EL1053

EL1053 EPOCH DATE - 2002.00

EL1053 X - -586,253.943 (meters) COMP

EL1053 Y - -5,249,233.090 (meters) COMP

EL1053 Z - 3,563,619.302 (meters) COMP

EL1053 LAPLACE CORR- -5.47 (seconds) DEFLEC09

EL1053 ELLIP HEIGHT- 194.214 (meters) (02/10/07) ADJUSTED

EL1053 GEOID HEIGHT- -26.30 (meters) GEOID09

EL1053

EL1053 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL1053 Type PID Designation North East Ellip

EL1053 -----

EL1053 NETWORK EL1053 HOPEWELL 1.59 1.33 3.63

EL1053 -----

EL1053

EL1053.The horizontal coordinates were established by GPS observations

EL1053.and adjusted by the National Geodetic Survey in February 2007.

EL1053

EL1053.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL1053.See [National Readjustment](#) for more information.

EL1053.The horizontal coordinates are valid at the epoch date displayed above.

EL1053.The epoch date for horizontal control is a decimal equivalence

EL1053.of Year/Month/Day.

EL1053

EL1053.The orthometric height was determined by GPS observations and a

EL1053.high-resolution geoid model.

EL1053

EL1053.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL1053

EL1053.The Laplace correction was computed from DEFLEC09 derived deflections.

EL1053

EL1053.The ellipsoidal height was determined by GPS observations

EL1053.and is referenced to NAD 83.

EL1053

EL1053.The geoid height was determined by GEOID09.

EL1053

EL1053; North East Units Scale Factor Converg.

EL1053;SPC OK S - 95,763.031 750,006.591 MT 0.99995997 +0 55 25.5

EL1053;SPC OK S - 314,182.54 2,460,646.62 sFT 0.99995997 +0 55 25.5

EL1053;UTM 14 - 3,785,873.487 742,136.947 MT 1.00032278 +1 28 37.2

EL1053

EL1053! - Elev Factor x Scale Factor = Combined Factor

EL1053!SPC OK S - 0.99996951 x 0.99995997 = 0.99992948

EL1053!UTM 14 - 0.99996951 x 1.00032278 = 1.00029228

EL1053

EL1053 SUPERSEDED SURVEY CONTROL

EL1053

EL1053 ELLIP H (04/16/01) 194.220 (m) GP( ) 4 2

EL1053 NAD 83(1993)- 34 11 08.72753(N) 096 22 21.35413(W) AD( ) B

EL1053 ELLIP H (05/09/94) 194.278 (m) GP( ) 4 2

EL1053

EL1053.Superseded values are not recommended for survey control.

EL1053.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL1053.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL1053

EL1053\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SQC4213685873(NAD 83)

EL1053\_MARKER: I = METAL ROD

EL1053\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

EL1053\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

EL1053\_STAMPING: HOPEWELL 1993

EL1053\_MARK LOGO: NGS

EL1053\_PROJECTION: RECESSED 2 CENTIMETERS

EL1053\_MAGNETIC: N = NO MAGNETIC MATERIAL

EL1053\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

EL1053\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL1053+SATELLITE: SATELLITE OBSERVATIONS - 1993

EL1053\_ROD/PIPE-DEPTH: 3.2 meters

EL1053\_SLEEVE-DEPTH : .9 meters

EL1053

EL1053 HISTORY - Date Condition Report By

EL1053 HISTORY - 1993 MONUMENTED NGS

EL1053

EL1053 STATION DESCRIPTION

EL1053

EL1053'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

EL1053'THE STATION IS LOCATED ABOUT 22 KM (13.65 MI) NORTH OF DURANT, 13 KM

EL1053'(8.05 MI) WEST OF U.S. HIGHWAY 69 AND 75, 4 KM (2.50 MI) EAST OF

EL1053'FOLSOM, IN GRASS AND BRUSH, ON THE WEST EDGE OF A LARGE OPEN PASTURE,

EL1053'IN THE SOUTHEAST QUADRANT OF THE INTERSECTION OF COOPER CREEK ROAD

EL1053'AND HOPEWELL ROAD, AND IN THE ROAD RIGHT-OF-WAY. OWNERSIP--

OKLAHOMA

EL1053'DEPARTMENT OF TRANSPORTATION.

EL1053'TO REACH FROM THE JUNCTION OF STATE HIGHWAYS 22 AND 48, ABOUT 1 KM

EL1053'(0.60 MI) WEST OF KENEFIC, GO NORTH AND NORTHWEST ON HIGHWAY 48 FOR

EL1053'2.27 KM (1.40 MI) TO THE ATOKA COUNTY LINE JUST AFTER A SMALL BRIDGE.

EL1053'CONTINUE AHEAD, NORTHWEST, ON HIGHWAY 48 FOR 4.46 KM (2.75 MI) TO A

EL1053'GRAVEL AND DIRT CROSSROAD (COOPER CREEK ROAD), ABOUT 0.8 KM

EL1053'(0.50 MI) SOUTHEAST OF THE FOLSOM FREEWILL BAPTIST CHURCH. TURN

EL1053'RIGHT, EAST, ON COOPER CREEK ROAD FOR 4.18 KM (2.60 MI) TO THE

EL1053'T-JUNCTION OF HOPEWELL ROAD. TURN RIGHT, SOUTH, ON HOPEWELL ROAD

FOR

EL1053'ABOUT 45 M (147.6 FT) TO THE STATION ON THE LEFT.

EL1053'THE STATION IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN A

EL1053'2.5 CM GREASE FILLED SLEEVE 90 CM LONG ENCASED IN A 12.7 CM PVC PIPE

EL1053 WITH A LOGO CAP SURROUNDED BY CONCRETE SET 2 CM BELOW THE GROUND.

IT

EL1053 IS 45.7 M (149.9 FT) SOUTH FROM THE EXTENDED CENTER OF COPPER CREEK

EL1053 ROAD, 8.1 M (26.6 FT) EAST FROM THE CENTER OF, AND LEVEL WITH

EL1053 HOPEWELL ROAD, 0.7 M (2.3 FT) WEST FROM A FENCE, 0.65 M (2.13 FT)

EL1053 SOUTH FROM A FIBERGLASS WITNESS POST, 0.66 M WEST OF A METAL WITNESS

EL1053 POST, AND 0.65 M (2.13 FT) NORTH FROM A FIBERGLASS WITNESS POST.

EL1053 DESCRIBED BY D.G. AUG.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL0811 \*\*\*\*\*

EL0811 CBN - This is a Cooperative Base Network Control Station.

**EL0811 DESIGNATION - JESSE**

EL0811 PID - EL0811

EL0811 STATE/COUNTY- OK/PONTOTOC

EL0811 USGS QUAD - HARDEN CITY (1966)

EL0811

EL0811 \*CURRENT SURVEY CONTROL

EL0811

EL0811\* NAD 83(2007)- 34 35 02.56197(N) 096 31 46.02052(W) ADJUSTED

EL0811\* NAVD 88 - 233.2 (meters) 765. (feet) GPS OBS

EL0811

EL0811 EPOCH DATE - 2002.00

EL0811 X - -597,785.664 (meters) COMP

EL0811 Y - -5,222,828.234 (meters) COMP

EL0811 Z - 3,600,088.964 (meters) COMP

EL0811 LAPLACE CORR- -6.73 (seconds) DEFLEC09

EL0811 ELLIP HEIGHT- 206.700 (meters) (02/10/07) ADJUSTED

EL0811 GEOID HEIGHT- -26.48 (meters) GEOID09

EL0811

EL0811 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EL0811 Type PID Designation North East Ellip

EL0811 -----

EL0811 NETWORK EL0811 JESSE 1.65 1.53 3.94

EL0811 -----

EL0811

EL0811.The horizontal coordinates were established by GPS observations

EL0811.and adjusted by the National Geodetic Survey in February 2007.

EL0811

EL0811.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EL0811.See [National Readjustment](#) for more information.

EL0811.The horizontal coordinates are valid at the epoch date displayed above.

EL0811.The epoch date for horizontal control is a decimal equivalence

EL0811.of Year/Month/Day.

EL0811

EL0811.The orthometric height was determined by GPS observations and a

EL0811.high-resolution geoid model.

EL0811

EL0811.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EL0811

EL0811.The Laplace correction was computed from DEFLEC09 derived deflections.

EL0811

EL0811.The ellipsoidal height was determined by GPS observations

EL0811.and is referenced to NAD 83.

EL0811

EL0811.The geoid height was determined by GEOID09.

EL0811

EL0811; North East Units Scale Factor Converg.

EL0811;SPC OK S - 139,715.755 734,906.176 MT 0.99993594 +0 50 05.0

EL0811;SPC OK S - 458,384.11 2,411,104.68 sFT 0.99993594 +0 50 05.0

EL0811:UTM 14 - 3,829,690.889 726,601.816 MT 1.00023295 +1 24 10.5

EL0811

EL0811! - Elev Factor x Scale Factor = Combined Factor

EL0811!SPC OK S - 0.99996755 x 0.99993594 = 0.99990350

EL0811!UTM 14 - 0.99996755 x 1.00023295 = 1.00020050

EL0811

EL0811: Primary Azimuth Mark

Grid Az

EL0811:SPC OK S - JESSE AZ MK 356 53 58.2

EL0811:UTM 14 - JESSE AZ MK 356 19 52.7

EL0811

EL0811|-----|

PID	Reference Object	Distance	Geod. Az
		dddmmss.s	
EL0811	CY1320 JESSE RM 1	12.841 METERS	17616
EL0811	CY1321 JESSE RM 2	31.650 METERS	24636
EL0811	CY1319 JESSE AZ MK		3574403.2

EL0811|

EL0811|CY1320 JESSE RM 1 12.841 METERS 17616 |

EL0811|CY1321 JESSE RM 2 31.650 METERS 24636 |

EL0811|CY1319 JESSE AZ MK 3574403.2 |

EL0811|-----|

EL0811

EL0811 SUPERSEDED SURVEY CONTROL

EL0811

EL0811 ELLIP H (04/16/01) 206.702 (m) GP( ) 4 2

EL0811 NAD 83(1993)- 34 35 02.56172(N) 096 31 46.02047(W) AD( ) B

EL0811 ELLIP H (05/09/94) 206.760 (m) GP( ) 4 2

EL0811 NAD 83(1986)- 34 35 02.56517(N) 096 31 46.01217(W) AD( ) 3

EL0811 NAD 27 - 34 35 02.23730(N) 096 31 45.00020(W) AD( ) 3

EL0811 NGVD 29 (07/19/86) 233.17 (m) 765.0 (f) LEVELING 3

EL0811

EL0811.Superseded values are not recommended for survey control.

EL0811.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL0811.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL0811

EL0811\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SQD2660129690(NAD 83)

EL0811\_MARKER: DS = TRIANGULATION STATION DISK

EL0811\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

EL0811\_SP\_SET: SQUARE CONCRETE MONUMENT

EL0811\_STAMPING: JESSE 1955

EL0811\_MARK LOGO: CGS

EL0811\_MAGNETIC: N = NO MAGNETIC MATERIAL

EL0811\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

EL0811+STABILITY: SURFACE MOTION

EL0811\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EL0811+SATELLITE: SATELLITE OBSERVATIONS - May 04, 1993

EL0811

EL0811 HISTORY - Date Condition Report By

EL0811 HISTORY - 1955 MONUMENTED CGS

EL0811 HISTORY - 1955 GOOD CGS

EL0811 HISTORY - 19930504 GOOD NGS

EL0811

EL0811 STATION DESCRIPTION

EL0811

EL0811'DESCRIBED BY COAST AND GEODETIC SURVEY 1955 (RLE)

EL0811'THE STATION IS ABOUT 6.5 MILES EAST-SOUTHEAST OF FITTSTOWN,

EL0811'ABOUT 5.0 MILES SOUTH OF STONEWALL, 0.1 MILE NORTH OF THE

EL0811'JESSE SCHOOL, 43 FEET EAST OF THE CENTER OF STATE HIGHWAY

EL0811'61, 8 FEET NORTHWEST OF A T FENCE CORNER, 4 FEET WEST OF

EL0811'A FENCE AND 4 FEET WEST OF A WITNESS POST. IT IS STAMPED





The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0640 \*\*\*\*\*

FK0640 CBN - This is a Cooperative Base Network Control Station.

**FK0640 DESIGNATION - COWDEN**

FK0640 PID - FK0640

FK0640 STATE/COUNTY- OK/WASHITA

FK0640 USGS QUAD - COLONY (1984)

FK0640

FK0640 \*CURRENT SURVEY CONTROL

FK0640

FK0640\* NAD 83(2007)- 35 17 25.90677(N) 098 42 44.04858(W) ADJUSTED

FK0640\* NAVD 88 - 487.7 (meters) 1600. (feet) GPS OBS

FK0640

FK0640 EPOCH DATE - 2002.00

FK0640 X - -789,509.255 (meters) COMP

FK0640 Y - -5,152,107.314 (meters) COMP

FK0640 Z - 3,664,489.372 (meters) COMP

FK0640 LAPLACE CORR- -1.52 (seconds) DEFLEC09

FK0640 ELLIP HEIGHT- 460.936 (meters) (02/10/07) ADJUSTED

FK0640 GEOID HEIGHT- -26.81 (meters) GEOID09

FK0640

FK0640 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FK0640 Type PID Designation North East Ellip

FK0640 -----

FK0640 NETWORK FK0640 COWDEN 1.31 1.12 3.19

FK0640 -----

FK0640

FK0640.The horizontal coordinates were established by GPS observations

FK0640.and adjusted by the National Geodetic Survey in February 2007.

FK0640

FK0640.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FK0640.See [National Readjustment](#) for more information.

FK0640.The horizontal coordinates are valid at the epoch date displayed above.

FK0640.The epoch date for horizontal control is a decimal equivalence

FK0640.of Year/Month/Day.

FK0640

FK0640.The orthometric height was determined by GPS observations and a

FK0640.high-resolution geoid model.

FK0640

FK0640.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0640

FK0640.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0640

FK0640.The ellipsoidal height was determined by GPS observations

FK0640.and is referenced to NAD 83.

FK0640

FK0640.The geoid height was determined by GEOID09.

FK0640

FK0640; North East Units Scale Factor Converg.

FK0640;SPC OK S - 217,335.592 535,211.727 MT 1.00001180 -0 24 15.4

FK0640;SPC OK S - 713,041.85 1,755,940.47 sFT 1.00001180 -0 24 15.4

FK0640;UTM 14 - 3,905,300.434 526,165.852 MT 0.99960844 +0 09 58.5

FK0640

FK0640! - Elev Factor x Scale Factor = Combined Factor

FK0640!SPC OK S - 0.99992766 x 1.00001180 = 0.99993945

FK0640!UTM 14 - 0.99992766 x 0.99960844 = 0.99953612

FK0640

FK0640 SUPERSEDED SURVEY CONTROL

FK0640

FK0640 ELLIP H (04/16/01) 460.943 (m) GP( ) 4 2

FK0640 NAD 83(1993)- 35 17 25.90670(N) 098 42 44.04830(W) AD( ) B

FK0640 ELLIP H (05/09/94) 460.980 (m) GP( ) 4 2

FK0640

FK0640.Superseded values are not recommended for survey control.

FK0640.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0640.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0640

FK0640\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE2616505300(NAD 83)

FK0640\_MARKER: I = METAL ROD

FK0640\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

FK0640\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

FK0640\_STAMPING: COWDEN 1993

FK0640\_MARK LOGO: NGS

FK0640\_PROJECTION: RECESSED 1 CENTIMETERS

FK0640\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0640\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

FK0640\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0640+SATELLITE: SATELLITE OBSERVATIONS - 1993

FK0640\_ROD/PIPE-DEPTH: 3.7 meters

FK0640

FK0640 HISTORY - Date Condition Report By

FK0640 HISTORY - 1993 MONUMENTED NGS

FK0640

FK0640 STATION DESCRIPTION

FK0640

FK0640'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

FK0640'STATION IS LOCATED ABOUT 21.5 KM (13.35 MI) EAST OF CORDELL, 8 KM

FK0640'(4.95 MI) WEST OF THE WASHITA-CADDO COUNTY LINE, AT COWDEN JUNCTION,

FK0640'IN THE SOUTHWEST ANGLE OF THE JUNCTION OF STATE HIGHWAYS 115 AND 152,

FK0640'ACROSS THE HIGHWAY FROM A STATE MAINTAINANCE YARD, ALONG THE

FK0640'NORTHWEST-SOUTHEAST RIGHT-OF-WAY FENCE, IN THE NORTHEAST CORNER OF

FK0640'SECTION 6, T 9 N, R 14 W. OWNERSHIP--OKLAHOMA DEPARTMENT OF

FK0640'TRANSPORTATION.

FK0640'TO REACH FROM THE JUNCTION OF HIGHWAYS 115 AND 152, GO WEST ON  
HIGHWAY

FK0640'152 FOR 44 M (144.4 FT) TO THE STATION ON THE LEFT.

FK0640'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN A

FK0640'2.5 CM GREASE FILLED SLEEVE ENCASED IN A 12.7 CM PVC PIPE WITH LOGO

FK0640'CAP SURROUNDED BY CONCRETE SET 1 CM BELOW GROUND. IT IS 36.7 M

FK0640'(120.4 FT) SOUTH FROM, AND 1 M (3.3 FT) HIGHER THAN THE CENTER OF

FK0640'HIGHWAY 152, 43.8 M (143.7 FT) WEST FROM THE SOUTH END OF A PAVED

FK0640'TRAFFIC ISLAND IN THE MIDDLE OF HIGHWAY 115, 25.6 M (84.0 FT)

FK0640'NORTHWEST FROM A FENCE CORNER AT A POWERLINE POLE, 30.2 M (99.1 FT)

FK0640'SOUTHEAST FROM A FENCE CORNER POST, 0.8 M (2.6 FT) NORTHEAST FROM A

FK0640'FIBERGLASS WITNESS POST IN THE PASTURE FENCE, 1.0 M (3.3 FT)

FK0640'SOUTHWEST OF A STEEL WITNESS POST, 1.2 M (3.9 FT) NORTHWEST OF A STEEL

FK0640'WITNESS POST, AND 1.1 M (3.6 FT) SOUTHEAST OF A STEEL WITNESS POST.

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EM0216 \*\*\*\*\*

**EM0216 DESIGNATION - K 29**

EM0216 PID - EM0216

EM0216 STATE/COUNTY- OK/KIOWA

EM0216 USGS QUAD - ROOSEVELT (1964)

EM0216

EM0216 \*CURRENT SURVEY CONTROL

EM0216

EM0216\* NAD 83(1993)- 34 50 56.08366(N) 099 01 31.18005(W) ADJUSTED

EM0216\* NAVD 88 - 446.389 (meters) 1464.53 (feet) ADJUSTED

EM0216

EM0216 X - -822,062.029 (meters) COMP

EM0216 Y - -5,175,487.124 (meters) COMP

EM0216 Z - 3,624,364.106 (meters) COMP

EM0216 LAPLACE CORR- 1.68 (seconds) DEFLEC09

EM0216 ELLIP HEIGHT- 420.234 (meters) (11/28/94) ADJUSTED

EM0216 GEOID HEIGHT- -25.55 (meters) GEOID09

EM0216 DYNAMIC HT - 445.949 (meters) 1463.08 (feet) COMP

EM0216 MODELED GRAV- 979,634.9 (mgal) NAVD 88

EM0216

EM0216 HORZ ORDER - SECOND

EM0216 VERT ORDER - SECOND CLASS 0

EM0216 ELLP ORDER - FIFTH CLASS I

EM0216

EM0216.The horizontal coordinates were established by GPS observations

EM0216.and adjusted by the National Geodetic Survey in November 1994.

EM0216

EM0216.The orthometric height was determined by differential leveling and

EM0216.adjusted in June 1991.

EM0216

EM0216.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EM0216

EM0216.The Laplace correction was computed from DEFLEC09 derived deflections.

EM0216

EM0216.The ellipsoidal height was determined by GPS observations

EM0216.and is referenced to NAD 83.

EM0216

EM0216.The geoid height was determined by GEOID09.

EM0216

EM0216.The dynamic height is computed by dividing the NAVD 88

EM0216.geopotential number by the normal gravity value computed on the

EM0216.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

EM0216.degrees latitude (g = 980.6199 gals.).

EM0216

EM0216.The modeled gravity was interpolated from observed gravity values.

EM0216

EM0216; North East Units Scale Factor Converg.

EM0216;SPC OK S - 168,590.639 506,234.602 MT 0.99994658 -0 34 55.2

EM0216;SPC OK S - 553,117.79 1,660,871.36 sFT 0.99994658 -0 34 55.2

EM0216;UTM 14 - 3,856,288.495 497,684.557 MT 0.99960007 -0 00 52.1

EM0216

EM0216! - Elev Factor x Scale Factor = Combined Factor  
 EM0216!SPC OK S - 0.99993404 x 0.99994658 = 0.99988062  
 EM0216!UTM 14 - 0.99993404 x 0.99960007 = 0.99953414

EM0216

EM0216 SUPERSEDED SURVEY CONTROL

EM0216

EM0216 NAD 83(1986)- 34 50 56.09028(N) 099 01 31.17125(W) AD( ) 2

EM0216 NGVD 29 (??/??/92) 446.236 (m) 1464.03 (f) ADJ UNCH 2 0

EM0216

EM0216.Superseded values are not recommended for survey control.

EM0216.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EM0216.[See file dsdata.txt](#) to determine how the superseded data were derived.

EM0216

EM0216\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SMD9768456288(NAD 83)

EM0216\_MARKER: DB = BENCH MARK DISK

EM0216\_SETTING: 31 = SET IN A PAVEMENT SUCH AS STREET, SIDEWALK, CURB, ETC.

EM0216\_SP\_SET: CURB

EM0216\_STAMPING: K 29 1934

EM0216\_MARK LOGO: CGS

EM0216\_MAGNETIC: N = NO MAGNETIC MATERIAL

EM0216\_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

EM0216\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EM0216+SATELLITE: SATELLITE OBSERVATIONS - March 01, 1989

EM0216

EM0216 HISTORY	- Date	Condition	Report By
EM0216 HISTORY	- 1934	MONUMENTED	CGS
EM0216 HISTORY	- 1940	GOOD	NGS
EM0216 HISTORY	- 1963	GOOD	NGS
EM0216 HISTORY	- 19890301	GOOD	NGS
EM0216 HISTORY	- 19960515	GOOD	OKDOT

EM0216

EM0216 STATION DESCRIPTION

EM0216

EM0216'DESCRIBED BY NATIONAL GEODETIC SURVEY 1940

EM0216'IN ROOSEVELT.

EM0216'AT ROOSEVELT, 6 FEET SOUTH OF THE SOUTHEAST CORNER OF THE ST.

EM0216'LOUIS-SAN FRANCISCO RAILWAY STATION, 12 FEET FROM THE TRACK, AND IN  
EM0216'THE TOP OF THE CONCRETE CURB, LEVEL WITH THE TRACK. A STANDARD DISK,

EM0216'STAMPED K 29 1934.

EM0216

EM0216 STATION RECOVERY (1963)

EM0216

EM0216'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1963

EM0216'RECOVERED IN GOOD CONDITION.

EM0216

EM0216 STATION RECOVERY (1989)

EM0216

EM0216'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1989

EM0216'THE STATION WAS RECOVERED IN GOOD CONDITION, A NEW DESCRIPTION

EM0216'FOLLOWS.

EM0216'THE STATION IS LOCATED ABOUT 25.5 KM (15.85 MI) SOUTHEAST OF LONE

EM0216'WOLF, 19.6 KM (12.20 MI) SOUTH OF HOBART, AND 0.2 KM (0.10 MI)

EM0216'SOUTHWEST OF ROOSEVELT. OWNERSHIP--BURLINGTON NORTHERN RAILROAD.

EM0216'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAY 183 AND STATE

EM0216'HIGHWAY 19 IN ROOSEVELT, GO SOUTH ON HIGHWAY 183 FOR 0.8 KM (0.50 MI)

EM0216 TO A CROSS STREET. TURN RIGHT AND GO WEST ON HUSTON STREET FOR 0.3 KM  
EM0216 (0.20 MI) TO THE STATION ON THE RIGHT, JUST AFTER CROSSING THE  
EM0216 BURLINGTON NORTHERN RAILROAD TRACKS.

EM0216 THE STATION IS A STANDARD CGS DISK SET IN THE TOP OF AN 11 CM WIDE  
EM0216 CONCRETE CURB THAT PROJECTS 4 CM ABOVE THE GROUND. LOCATED 31.2 M  
EM0216 (102.4 FT) NORTH OF THE CENTER OF THE STREET, 10.5 M (34.4 FT) EAST OF  
EM0216 THE NEAR RAIL, 7.9 M (25.9 FT) SOUTH-SOUTHWEST OF THE ROOSEVELT  
EM0216 SIGNPOST, 5.1 M (16.7 FT) WEST OF THE NEAR RAIL OF THE MAIN RAIL, AND  
EM0216 1.1 M (3.6 FT) SOUTH OF A CARSONITE WITNESS POST.

EM0216 DESCRIBED BY E.J. HANSMANN, TYPED BY RLZ.

EM0216

EM0216 STATION RECOVERY (1996)

EM0216

EM0216 RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 1996 (LDR)

EM0216 RECOVERED AS DESCRIBED.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EM0162 \*\*\*\*\*

EM0162 FBN - This is a Federal Base Network Control Station.

## EM0162 DESIGNATION - UPTO

EM0162 PID - EM0162

EM0162 STATE/COUNTY- OK/KIOWA

EM0162 USGS QUAD - SNYDER (1991)

EM0162

EM0162 \*CURRENT SURVEY CONTROL

EM0162

EM0162\* NAD 83(2007)- 34 40 40.80214(N) 098 57 02.59130(W) ADJUSTED

EM0162\* NAVD 88 - 422.909 (meters) 1387.49 (feet) ADJUSTED

EM0162

EM0162 EPOCH DATE - 2002.00

EM0162 X - -817,001.238 (meters) COMP

EM0162 Y - -5,187,214.518 (meters) COMP

EM0162 Z - 3,608,773.876 (meters) COMP

EM0162 LAPLACE CORR- 2.69 (seconds) DEFLEC09

EM0162 ELLIP HEIGHT- 397.237 (meters) (02/10/07) ADJUSTED

EM0162 GEOID HEIGHT- -25.68 (meters) GEOID09

EM0162 DYNAMIC HT - 422.490 (meters) 1386.12 (feet) COMP

EM0162

EM0162 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

EM0162 Type PID Designation North East Ellip

EM0162 -----

EM0162 NETWORK EM0162 UPTO 0.41 0.35 1.02

EM0162 -----

EM0162 MODELED GRAV- 979,630.8 (mgal) NAVD 88

EM0162

EM0162 VERT ORDER - SECOND CLASS 0

EM0162

EM0162.The horizontal coordinates were established by GPS observations

EM0162.and adjusted by the National Geodetic Survey in February 2007.

EM0162

EM0162.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

EM0162.See [National Readjustment](#) for more information.

EM0162.The horizontal coordinates are valid at the epoch date displayed above.

EM0162.The epoch date for horizontal control is a decimal equivalence

EM0162.of Year/Month/Day.

EM0162

EM0162.The orthometric height was determined by differential leveling and

EM0162.adjusted in June 1991.

EM0162

EM0162.The X, Y, and Z were computed from the position and the ellipsoidal ht.

EM0162

EM0162.The Laplace correction was computed from DEFLEC09 derived deflections.

EM0162

EM0162.The ellipsoidal height was determined by GPS observations

EM0162.and is referenced to NAD 83.

EM0162

EM0162.The geoid height was determined by GEOID09.

EM0162

EM0162.The dynamic height is computed by dividing the NAVD 88  
EM0162.geopotential number by the normal gravity value computed on the  
EM0162.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
EM0162.degrees latitude (g = 980.6199 gals.).

EM0162

EM0162.The modeled gravity was interpolated from observed gravity values.

EM0162

EM0162;	North	East	Units	Scale	Factor	Converg.
EM0162;SPC OK S	- 149,565.527	512,878.667	MT	0.99993728	-0 32	22.7
EM0162;SPC OK S	- 490,699.57	1,682,669.43	sFT	0.99993728	-0 32	22.7
EM0162;UTM 14	- 3,837,336.607	504,514.444	MT	0.99960025	+0 01	40.9

EM0162

EM0162! - Elev Factor x Scale Factor = Combined Factor  
EM0162!SPC OK S - 0.99993765 x 0.99993728 = 0.99987493  
EM0162!UTM 14 - 0.99993765 x 0.99960025 = 0.99953792

EM0162

EM0162:	Primary Azimuth Mark	Grid Az
EM0162:SPC OK S	- SNYDER	157 17 54.5
EM0162:UTM 14	- SNYDER	156 43 50.9

EM0162

EM0162	PID	Reference Object	Distance	Geod. Az
EM0162			dddmmss.s	
EM0162	EM0163	UPTO RM 1	8.820 METERS	00538
EM0162	EM0856	SNYDER	APPROX. 3.8 KM	1564531.8
EM0162	EM0854	SNYDER MUNICIPAL TANK	APPROX. 2.7 KM	1782328.2
EM0162	CX8892	UPTO RM 2	18.455 METERS	22526
EM0162	EM0853	MOUNTAIN PARK MUNICIPAL TANK	APPROX. 1.5 KM	3592929.0

EM0162

EM0162 SUPERSEDED SURVEY CONTROL

EM0162

EM0162	ELLIP H (06/09/00)	397.239 (m)	GP( ) 2 2
EM0162	NAD 83(1993)-	34 40 40.80237(N)	098 57 02.59135(W) AD( ) B
EM0162	ELLIP H (05/09/94)	397.298 (m)	GP( ) 4 2
EM0162	NAD 83(1986)-	34 40 40.81253(N)	098 57 02.57984(W) AD( ) 2
EM0162	NAD 27	- 34 40 40.56230(N)	098 57 01.30700(W) AD( ) 2
EM0162	NAVD 88 (05/09/94)	422.91 (m)	1387.5 (f) LEVELING 3
EM0162	NGVD 29 (??/??/92)	422.772 (m)	1387.04 (f) ADJ UNCH 2 0

EM0162

EM0162.Superseded values are not recommended for survey control.

EM0162.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EM0162.[See file dsdata.txt](#) to determine how the superseded data were derived.

EM0162

EM0162\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SND0451437336(NAD 83)

EM0162\_MARKER: DS = TRIANGULATION STATION DISK

EM0162\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

EM0162\_SP\_SET: SQUARE CONCRETE MONUMENT

EM0162\_STAMPING: UPTO 1961

EM0162\_MARK LOGO: CGS

EM0162\_MAGNETIC: N = NO MAGNETIC MATERIAL

EM0162\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

EM0162+STABILITY: SURFACE MOTION

EM0162\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

EM0162+SATELLITE: SATELLITE OBSERVATIONS - September 13, 2001

EM0162

EM0162 HISTORY	- Date	Condition	Report By
EM0162 HISTORY	- 1961	MONUMENTED	CGS
EM0162 HISTORY	- 1961	GOOD	CGS
EM0162 HISTORY	- 1963	GOOD	CGS
EM0162 HISTORY	- 1988	GOOD	NGS
EM0162 HISTORY	- 19930411	GOOD	NGS
EM0162 HISTORY	- 19990819	GOOD	NGS
EM0162 HISTORY	- 20010913	GOOD	LOCSUR

EM0162

EM0162 STATION DESCRIPTION

EM0162

EM0162'DESCRIBED BY COAST AND GEODETIC SURVEY 1961 (NES)

EM0162'THE STATION IS ABOUT 1-1/4 MILES NORTH OF SNYDER AND ON THE  
EM0162'RIGHT-OF-WAY OF U.S. HIGHWAY 183. IT IS 102.6 FEET NORTHEAST  
EM0162'OF THE NORTHEAST CORNER OF A FRAME HOUSE, 39 FEET WEST OF  
EM0162'THE CENTER LINE OF THE HIGHWAY, 12 FEET NORTHWEST OF A TELEPHONE  
EM0162'POLE AND 11.0 FEET WEST OF A METAL WITNESS POST. THE SQUARE  
EM0162'CONCRETE MONUMENT PROJECTS 3 INCHES AND THE DISK IS STAMPED  
EM0162'UPTO 1961.

EM0162'

EM0162'REFERENCE MARK 1 IS 35 FEET SOUTH OF A POWER POLE, 40 FEET  
EM0162'WEST OF THE CENTER LINE OF THE HIGHWAY AND 34.5 FEET NORTH OF  
EM0162'THE METAL WITNESS POST. THE CONCRETE MONUMENT PROJECTS 4  
EM0162'INCHES AND THE DISK IS STAMPED UPTO NO 1 1961.

EM0162'

EM0162'REFERENCE MARK 2 IS 78 FEET WEST OF THE CENTER LINE OF THE  
EM0162'HIGHWAY, 64.7 FEET SOUTHWEST OF THE METAL WITNESS POST AND 43  
EM0162'FEET NORTHEAST OF THE NORTHEAST CORNER OF THE FRAME HOUSE.  
EM0162'THE CONCRETE MONUMENT IS 2 INCHES BELOW THE SURFACE OF THE GROUND  
EM0162'AND THE DISK IS STAMPED UPTO NO 2 1961.

EM0162'

EM0162'TO REACH THE STATION FROM THE POST OFFICE IN SNYDER, GO  
EM0162'NORTHERLY ON U.S. HIGHWAY 183 FOR 1.25 MILES TO THE STATION  
EM0162'ON THE LEFT, WEST, SIDE OF THE ROAD.

EM0162'

EM0162'NOTE--STATION SNYDER 1935 MAY BE USED AS AN AZIMUTH MARK.

EM0162'

EM0162'HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.

EM0162

EM0162 STATION RECOVERY (1961)

EM0162

EM0162'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1961

EM0162'1.2 MI N FROM SNYDER.

EM0162'1.25 MILES NORTH ALONG U.S. HIGHWAY 183 FROM THE POST OFFICE IN  
EM0162'SNYDER, SET IN A SQUARE CONCRETE MONUMENT THAT PROJECTS 3 INCHES, 39  
EM0162'FEET WEST OF THE CENTER OF THE HIGHWAY, 12 FEET NORTHWEST OF A  
EM0162'TELEPHONE POLE, AND 11.0 FEET WEST OF A WITNESS POST.

EM0162

EM0162 STATION RECOVERY (1963)

EM0162

EM0162'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1963 (LBO)

EM0162'STATION RECOVERED AND ALL MARKS WERE FOUND IN GOOD

EM0162'CONDITION AS DESCRIBED.

EM0162

EM0162 STATION RECOVERY (1988)



EM0162

EM0162'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1988 (LDA)

EM0162'THE STATION WAS RECOVERED AT THIS DATE.

EM0162'OTHER MARKS WERE NOT SEARCHED FOR.

EM0162'

EM0162'THE STATION IS LOCATED ABOUT 2.3 KM (1.4 MI)

EM0162'NORTH OF SNYDER AND ON RIGHT-OF-WAY OF US HIGHWAY 183.

EM0162'OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION, OKLAHOMA CITY,  
OK

EM0162'73105, PHONE 405-521-2554.

EM0162'THIS STATION IS ALSO NEAR PROPERTY OWNED BY MR. FLOYD PATTERSON,

EM0162'ROUTE 2, BOX 17, SNYDER OK 73566, PHONE 405-569-2573.

EM0162'

EM0162'TO REACH THE STATION FROM THE SNYDER 1930 CITY HALL IN SNYDER, GO

EM0162'NORTH ON US HIGHWAY 183 FOR 2.3 KM (1.4 MI) TO THE STATION ON THE

EM0162'LEFT.

EM0162'

EM0162'THE STATION IS A STANDARD CGS STATION MARK DISK STAMPED---UPTO

EM0162'1961---, SET IN THE TOP OF A SQUARE CONCRETE POST THAT IS FLUSH

EM0162'WITH THE GROUND SURFACE. LOCATED 31.3 METERS (102.6 FT) NORTHEAST

EM0162'FROM NORTHEAST CORNER OF FRAME HOUSE, 11.4 METERS (37.5 FT) WEST

EM0162'FROM CENTER OF US HIGHWAY 183 AND 3.7 METERS (12.0 FT) NORTHWEST

EM0162'FROM TELEPHONE POLE AND A FIBERGLASS WITNESS POST.

EM0162'

EM0162'GPS SURVEY, FORT SILL, OKLAHOMA.

EM0162'

EM0162'THIS STATION IS SUITABLE FOR GPS SURVEYS.

EM0162'

EM0162'DESCRIBED BY D.A. BOWLING.

EM0162

EM0162                   STATION RECOVERY (1993)

EM0162

EM0162'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993

EM0162'STATION MARK RECOVERED IN GOOD CONDITION. REFERENCE MARKS 1 AND 2

EM0162'WERE NOT RECOVERED. THE HOUSE AT THE STATION SITE HAS BEEN REMOVED  
EM0162'ALONG WITH MOST OF THE REFERENCE POINTS.

EM0162'STATION IS LOCATED ABOUT 2 KM (1.25 MI) NORTH OF SNYDER, ALONG US

EM0162'HIGHWAY 183, ON THE RIGHT-OF-WAY, AT THE SOUTH END OF A SLIGHT CURVE,

EM0162'AT A METAL SHOP-TYPE BUILDING, IN GRASS, IN A CIRCULAR DIRT DRIVE.

EM0162'OWNERSHIP--OKLAHOMA DEPARTMENT OF TRANSPORTATION.

EM0162'TO REACH FROM THE OVERPASS AT THE JUNCTION OF US HIGHWAYS 62 AND 183

EM0162'ABOUT 2 KM (1.25 MI) SOUTH OF SNYDER, GO NORTH ON HIGHWAY 183 FOR

EM0162'2.98 KM (1.85 MI) TO THE RAILROAD CROSSING IN SNYDER. CONTINUE AHEAD

EM0162'FOR 1.53 KM (0.95 MI) TO THE BEGINNING OF A CURVE AND THE STATION ON

EM0162'THE LEFT.

EM0162'STATION MARK IS SET IN THE TOP OF A 30-CM SQUARE CONCRETE POST 2 CM

EM0162'BELOW GROUND. IT IS 17.2 M (56.4 FT) WEST OF, AND SLIGHTLY LOWER

EM0162'THAN THE HIGHWAY CENTER, 0.2 M (0.7 FT) EAST OF A FIBERGLASS WITNESS

EM0162'POST, 19.8 M (65.0 FT) SOUTH-SOUTHEAST OF UTILITY POLE 0267-02-8874,

EM0162'22.5 M (73.8 FT) EAST OF THE SOUTHEAST CORNER OF THE BUILDING, 23.6 M

EM0162'(77.4 FT) EAST-SOUTHEAST OF THE NORTHEAST CORNER, AND 0.4 M (1.3 FT)

EM0162'NORTH OF THE EXTENDED SOUTH WALL OF THE BUILDING.

EM0162

EM0162                   STATION RECOVERY (1999)

EM0162

EM0162'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (CSM)

EM0162'RECOVERED AS DESCRIBED.

EM0162

EM0162                    STATION RECOVERY (2001)

EM0162

EM0162'RECOVERY NOTE BY LOCAL SURVEYOR (INDIVIDUAL OR FIRM) 2001 (DP)

EM0162'RECOVERED IN GOOD CONDITION.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0486 \*\*\*\*\*

### FK0486 DESIGNATION - R 103

FK0486 PID - FK0486

FK0486 STATE/COUNTY- OK/ROGER MILLS

FK0486 USGS QUAD - MACKIE (1989)

FK0486

FK0486 \*CURRENT SURVEY CONTROL

FK0486

FK0486\* NAD 83(1986)- 35 40 43. (N) 099 51 00. (W) SCALED

FK0486\* NAVD 88 - 650.531 (meters) 2134.28 (feet) ADJUSTED

FK0486

FK0486 GEOID HEIGHT- -27.96 (meters) GEOID09

FK0486 DYNAMIC HT - 649.838 (meters) 2132.01 (feet) COMP

FK0486 MODELED GRAV- 979,548.3 (mgal) NAVD 88

FK0486

FK0486 VERT ORDER - SECOND CLASS 0

FK0486

FK0486.The horizontal coordinates were scaled from a topographic map and have

FK0486.an estimated accuracy of +/- 6 seconds.

FK0486

FK0486.The orthometric height was determined by differential leveling and

FK0486.adjusted in June 1991.

FK0486

FK0486.The geoid height was determined by GEOID09.

FK0486

FK0486.The dynamic height is computed by dividing the NAVD 88

FK0486.geopotential number by the normal gravity value computed on the

FK0486.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0486.degrees latitude (g = 980.6199 gals.).

FK0486

FK0486.The modeled gravity was interpolated from observed gravity values.

FK0486

FK0486; North East Units Estimated Accuracy

FK0486,SPC OK N - 76,890. 432,540. MT (+/- 180 meters Scaled)

FK0486

FK0486 SUPERSEDED SURVEY CONTROL

FK0486

FK0486 NGVD 29 (??/??/92) 650.231 (m) 2133.30 (f) ADJ UNCH 2 0

FK0486

FK0486.Superseded values are not recommended for survey control.

FK0486.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0486.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0486

FK0486\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME230486(NAD 83)

FK0486\_MARKER: DB = BENCH MARK DISK

FK0486\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0486\_SP\_SET: SET IN TOP OF CONCRETE MONUMENT

FK0486\_STAMPING: R-103 1934

FK0486\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0486+STABILITY: SURFACE MOTION

FK0486

FK0486 HISTORY - Date Condition Report By  
FK0486 HISTORY - 1934 MONUMENTED CGS

FK0486

FK0486 STATION DESCRIPTION

FK0486

FK0486'DESCRIBED BY COAST AND GEODETIC SURVEY 1934

FK0486'4.4 MI NE FROM REYDON.

FK0486'4.4 MILES NORTHEAST OF P. AND SF. RR. STATION AT REYDON 0.45

FK0486'MILE NORTHEAST OF MILEPOST 66, 0.15 MILE NORTHEAST OF PANHANDLE

FK0486'AND SANTA FE RAILROAD CULVERT 66 B, 74 FEET NORTH OF NEAREST

FK0486'RAIL OF TRACK.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0483 \*\*\*\*\*

### FK0483 DESIGNATION - U 103

FK0483 PID - FK0483

FK0483 STATE/COUNTY- OK/ROGER MILLS

FK0483 USGS QUAD - MACKIE (1989)

FK0483

FK0483 \*CURRENT SURVEY CONTROL

FK0483

FK0483\* NAD 83(1986)- 35 40 05. (N) 099 46 24. (W) SCALED

FK0483\* NAVD 88 - 612.548 (meters) 2009.67 (feet) ADJUSTED

FK0483

FK0483 GEOID HEIGHT- -27.95 (meters) GEOID09

FK0483 DYNAMIC HT - 611.901 (meters) 2007.55 (feet) COMP

FK0483 MODELED GRAV- 979,557.4 (mgal) NAVD 88

FK0483

FK0483 VERT ORDER - SECOND CLASS 0

FK0483

FK0483.The horizontal coordinates were scaled from a topographic map and have

FK0483.an estimated accuracy of +/- 6 seconds.

FK0483

FK0483.The orthometric height was determined by differential leveling and

FK0483.adjusted in June 1991.

FK0483

FK0483.The geoid height was determined by GEOID09.

FK0483

FK0483.The dynamic height is computed by dividing the NAVD 88

FK0483.geopotential number by the normal gravity value computed on the

FK0483.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0483.degrees latitude (g = 980.6199 gals.).

FK0483

FK0483.The modeled gravity was interpolated from observed gravity values.

FK0483

FK0483; North East Units Estimated Accuracy

FK0483;SPC OK N - 75,590. 439,450. MT (+/- 180 meters Scaled)

FK0483

FK0483 SUPERSEDED SURVEY CONTROL

FK0483

FK0483 NGVD 29 (??/??/92) 612.261 (m) 2008.73 (f) ADJ UNCH 2 0

FK0483

FK0483.Superseded values are not recommended for survey control.

FK0483.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0483.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0483

FK0483\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME300474(NAD 83)

FK0483\_MARKER: DB = BENCH MARK DISK

FK0483\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0483\_SP\_SET: SET IN TOP OF CONCRETE MONUMENT

FK0483\_STAMPING: U-103 1934

FK0483\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0483+STABILITY: SURFACE MOTION

FK0483

FK0483 HISTORY	- Date	Condition	Report By
FK0483 HISTORY	- 1934	MONUMENTED	CGS

FK0483

FK0483 STATION DESCRIPTION

FK0483

FK0483'DESCRIBED BY COAST AND GEODETIC SURVEY 1934

FK0483'8.4 MI NW FROM CHEYENNE.

FK0483'8.4 MILES NORTHWEST OF P. AND SF. RR. STATION AT CHEYENNE

FK0483'0.4 MILE SOUTH OF MILEPOST 72, 72 FEET EAST OF NEAREST RAIL OF

FK0483'PANHANDLE AND SANTA FE TRACK, 36 FEET SOUTH OF CENTER LINE OF

FK0483'SECTION LINE ROAD.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0467 \*\*\*\*\*

## FK0467 DESIGNATION - W 104

FK0467 PID - FK0467

FK0467 STATE/COUNTY- OK/ROGER MILLS

FK0467 USGS QUAD - ROLL (1966)

FK0467

FK0467 \*CURRENT SURVEY CONTROL

FK0467

FK0467\* NAD 83(1986)- 35 49 53. (N) 099 43 48. (W) SCALED

FK0467\* NAVD 88 - 670.469 (meters) 2199.70 (feet) ADJUSTED

FK0467

FK0467 GEOID HEIGHT- -28.28 (meters) GEOID09

FK0467 DYNAMIC HT - 669.766 (meters) 2197.39 (feet) COMP

FK0467 MODELED GRAV- 979,563.0 (mgal) NAVD 88

FK0467

FK0467 VERT ORDER - SECOND CLASS 0

FK0467

FK0467.The horizontal coordinates were scaled from a topographic map and have

FK0467.an estimated accuracy of +/- 6 seconds.

FK0467

FK0467.The orthometric height was determined by differential leveling and

FK0467.adjusted in June 1991.

FK0467

FK0467.The geoid height was determined by GEOID09.

FK0467

FK0467.The dynamic height is computed by dividing the NAVD 88

FK0467.geopotential number by the normal gravity value computed on the

FK0467.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0467.degrees latitude (g = 980.6199 gals.).

FK0467

FK0467.The modeled gravity was interpolated from observed gravity values.

FK0467

FK0467; North East Units Estimated Accuracy

FK0467;SPC OK N - 93,640. 443,700. MT (+/- 180 meters Scaled)

FK0467

FK0467 SUPERSEDED SURVEY CONTROL

FK0467

FK0467 NGVD 29 (??/??/92) 670.168 (m) 2198.71 (f) ADJ UNCH 2 0

FK0467

FK0467.Superseded values are not recommended for survey control.

FK0467.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0467.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0467

FK0467\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME340654(NAD 83)

FK0467\_MARKER: DB = BENCH MARK DISK

FK0467\_SETTING: 32 = SET IN A RETAINING WALL OR CONCRETE LEDGE

FK0467\_SP\_SET: CULVERT HEADWALL

FK0467\_STAMPING: W 104 1934

FK0467\_MARK LOGO: CGS

FK0467\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0467\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0467+STABILITY: SURFACE MOTION

FK0467

FK0467 HISTORY - Date Condition Report By

FK0467 HISTORY - 1934 MONUMENTED CGS

FK0467 HISTORY - 19950913 GOOD OKDOT

FK0467

FK0467 STATION DESCRIPTION

FK0467

FK0467'DESCRIBED BY COAST AND GEODETIC SURVEY 1934

FK0467'16 MI NW FROM CHEYENNE.

FK0467'16.0 MILES NORTHWEST OF P. AND SF. RR. STATION AT CHEYENNE

FK0467'19 FEET WEST OF CENTER LINE OF U.S. HIGHWAY 283, ON SOUTH END

FK0467'OF WEST HEADWALL OF CONCRETE CULVERT.

FK0467

FK0467 STATION RECOVERY (1995)

FK0467

FK0467'RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 1995 (LDR)

FK0467'RECOVERED AS DESCRIBED.

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DRAFT



The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0263 \*\*\*\*\*

### FK0263 DESIGNATION - 9 D 60

FK0263 PID - FK0263

FK0263 STATE/COUNTY- OK/CUSTER

FK0263 USGS QUAD - CUSTER CITY (1983)

FK0263

FK0263 \*CURRENT SURVEY CONTROL

FK0263

FK0263\* NAD 83(1986)- 35 39 37.17 (N) 098 57 35.84 (W) HD\_HELD1

FK0263\* NAVD 88 - 513.246 (meters) 1683.87 (feet) ADJUSTED

FK0263

FK0263 GEOID HEIGHT- -27.45 (meters) GEOID09

FK0263 DYNAMIC HT - 512.731 (meters) 1682.18 (feet) COMP

FK0263 MODELED GRAV- 979,615.0 (mgal) NAVD 88

FK0263

FK0263 VERT ORDER - SECOND CLASS 0

FK0263

FK0263.The horizontal coordinates were established by differentially corrected

FK0263.hand held GPS obs and have an estimated accuracy of +/- 3 meters.

FK0263

FK0263.The orthometric height was determined by differential leveling and

FK0263.adjusted in June 1991.

FK0263

FK0263.The geoid height was determined by GEOID09.

FK0263

FK0263.The dynamic height is computed by dividing the NAVD 88

FK0263.geopotential number by the normal gravity value computed on the

FK0263.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0263.degrees latitude (g = 980.6199 gals.).

FK0263

FK0263.The modeled gravity was interpolated from observed gravity values.

FK0263

FK0263; North East Units Estimated Accuracy

FK0263;SPC OK N - 73,694.7 513,080.0 MT (+/- 3 meters HH1 GPS)

FK0263

FK0263 SUPERSEDED SURVEY CONTROL

FK0263

FK0263 NGVD 29 (??/??/92) 513.023 (m) 1683.14 (f) ADJ UNCH 2 0

FK0263

FK0263.Superseded values are not recommended for survey control.

FK0263.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0263.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0263

FK0263\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE0362446275(NAD 83)

FK0263\_MARKER: DD = SURVEY DISK

FK0263\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0263\_SP\_SET: SET IN TOP OF CONCRETE MONUMENT

FK0263\_STAMPING: 9 D 60 TT 1934

FK0263\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0263+STABILITY: SURFACE MOTION

FK0263

FK0263 HISTORY - Date Condition Report By  
FK0263 HISTORY - 1934 MONUMENTED OKGS

FK0263

FK0263 STATION DESCRIPTION

FK0263

FK0263'DESCRIBED BY OKLAHOMA GEODETIC SURVEY 1934

FK0263'6 MI N FROM ARAPAHO.

FK0263'6.0 MILES NORTH ALONG STATE HIGHWAY 14 FROM THE COURTHOUSE AT  
FK0263'ARAPAHO, CUSTER COUNTY, 0.6 MILE SOUTH OF THE JUNCTION OF STATE  
FK0263'HIGHWAY 33, 54 FEET EAST OF THE CENTERLINE OF THE HIGHWAY, ABOUT  
FK0263'3-1/2 FEET INSIDE A FENCE CORNER. A STATE SURVEY STANDARD

FK0263'DISK SET IN THE TOP OF A CONCRETE POST. A DEC. 1938 REPORT

FK0263'SUGGESTS A CHANGE IN DESCRIPTION-- 0.5 MILE SOUTH OF THE NORTH

FK0263'JUNCTION OF STATE HIGHWAYS 14 AND 33 AND INSIDE A HALF

FK0263'SECTION-LINE FENCE CORNER.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0261 \*\*\*\*\*

FK0261 FBN - This is a Federal Base Network Control Station.

**FK0261 DESIGNATION - H 114**

FK0261 PID - FK0261

FK0261 STATE/COUNTY- OK/CUSTER

FK0261 USGS QUAD - CUSTER CITY (1983)

FK0261

FK0261 \*CURRENT SURVEY CONTROL

FK0261

FK0261\* NAD 83(2007)- 35 41 47.14090(N) 098 58 09.02090(W) ADJUSTED

FK0261\* NAVD 88 - 534.356 (meters) 1753.13 (feet) ADJUSTED

FK0261

FK0261 EPOCH DATE - 2002.00

FK0261 X - -808,534.381 (meters) COMP

FK0261 Y - -5,122,722.408 (meters) COMP

FK0261 Z - 3,701,184.815 (meters) COMP

FK0261 LAPLACE CORR- 3.01 (seconds) DEFLEC09

FK0261 ELLIP HEIGHT- 506.835 (meters) (02/10/07) ADJUSTED

FK0261 GEOID HEIGHT- -27.51 (meters) GEOID09

FK0261 DYNAMIC HT - 533.819 (meters) 1751.37 (feet) COMP

FK0261

FK0261 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FK0261 Type PID Designation North East Ellip

FK0261 -----

FK0261 NETWORK FK0261 H 114 0.37 0.31 0.90

FK0261 -----

FK0261 MODELED GRAV- 979,613.3 (mgal) NAVD 88

FK0261

FK0261 VERT ORDER - SECOND CLASS 0

FK0261

FK0261.The horizontal coordinates were established by GPS observations

FK0261.and adjusted by the National Geodetic Survey in February 2007.

FK0261

FK0261.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FK0261.See [National Readjustment](#) for more information.

FK0261.The horizontal coordinates are valid at the epoch date displayed above.

FK0261.The epoch date for horizontal control is a decimal equivalence

FK0261.of Year/Month/Day.

FK0261

FK0261.The orthometric height was determined by differential leveling and

FK0261.adjusted in June 1991.

FK0261

FK0261.[Photographs](#) are available for this station.

FK0261

FK0261.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0261

FK0261.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0261

FK0261.The ellipsoidal height was determined by GPS observations

FK0261.and is referenced to NAD 83.

FK0261

FK0261.The geoid height was determined by GEOID09.

FK0261

FK0261.The dynamic height is computed by dividing the NAVD 88

FK0261.geopotential number by the normal gravity value computed on the

FK0261.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0261.degrees latitude (g = 980.6199 gals.).

FK0261

FK0261.The modeled gravity was interpolated from observed gravity values.

FK0261

FK0261; North East Units Scale Factor Converg.

FK0261;SPC OK N - 77,708.474 512,285.463 MT 0.99997898 -0 34 19.0

FK0261;SPC OK N - 254,948.55 1,680,723.22 sFT 0.99997898 -0 34 19.0

FK0261;UTM 14 - 3,950,279.175 502,789.021 MT 0.99960010 +0 01 04.8

FK0261

FK0261! - Elev Factor x Scale Factor = Combined Factor

FK0261!SPC OK N - 0.99992046 x 0.99997898 = 0.99989944

FK0261!UTM 14 - 0.99992046 x 0.99960010 = 0.99952059

FK0261

FK0261 SUPERSEDED SURVEY CONTROL

FK0261

FK0261 ELLIP H (06/09/00) 506.827 (m) GP( ) 2 2

FK0261 NAD 83(1993)- 35 41 47.14074(N) 098 58 09.02011(W) AD( ) B

FK0261 ELLIP H (05/09/94) 506.864 (m) GP( ) 4 2

FK0261 NAVD 88 (05/09/94) 534.36 (m) 1753.1 (f) LEVELING 3

FK0261 NGVD 29 (??/??/92) 534.128 (m) 1752.38 (f) ADJ UNCH 2 0

FK0261

FK0261.Superseded values are not recommended for survey control.

FK0261.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0261.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0261

FK0261\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE0278950279(NAD 83)

FK0261\_MARKER: DB = BENCH MARK DISK

FK0261\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FK0261\_SP\_SET: CONCRETE POST

FK0261\_STAMPING: H 114 1935

FK0261\_MARK LOGO: CGS

FK0261\_PROJECTION: RECESSED 10 CENTIMETERS

FK0261\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0261\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FK0261+STABILITY: SURFACE MOTION

FK0261\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0261+SATELLITE: SATELLITE OBSERVATIONS - June 01, 2001

FK0261

FK0261 HISTORY - Date Condition Report By

FK0261 HISTORY - 1935 MONUMENTED CGS

FK0261 HISTORY - 19930517 GOOD NGS

FK0261 HISTORY - 19990813 GOOD NGS

FK0261 HISTORY - 20010601 GOOD MSAM

FK0261

FK0261 STATION DESCRIPTION

FK0261

FK0261'DESCRIBED BY COAST AND GEODETIC SURVEY 1935

FK0261'8.5 MI N FROM ARAPAHO.

FK0261'8.5 MILES NORTH ALONG STATE HIGHWAY 14 FROM THE COURTHOUSE AT

FK0261'ARAPAHO, CUSTER COUNTY, 81 FEET NORTHEAST OF THE PRAIRIEVIEW

FK0261'SCHOOL HOUSE, 54 FEET WEST OF THE CENTERLINE OF THE HIGHWAY,  
FK0261'33 FEET SOUTH OF THE CENTERLINE OF A SECTION-LINE ROAD, AND  
FK0261'JUST OUTSIDE OF THE FENCE AROUND THE SCHOOLYARD. A STANDARD  
FK0261'DISK SET IN THE TOP OF A CONCRETE POST. NOTE-- IN FEB. 1956  
FK0261'USGS REPORTED-- PRAIRIE GARDEN SCHOOL NO LONGER EXISTS.  
FK0261'DESCRIPTION READS-- 8.5 MILES NORTH ALONG STATE HIGHWAY 14 FROM  
FK0261'THE COURTHOUSE AT ARAPAHO, NEAR CORNER SECTIONS 11, 12, 13, 14,  
FK0261'T 14 N, R 17 W, AT THE CROSSROADS.

FK0261

STATION RECOVERY (1993)

FK0261

FK0261'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993

FK0261'STATION IS LOCATED ABOUT 13 KM (8.05 MI) NORTH OF ARAPAHOE, 8 KM  
FK0261'(4.95 MI) WEST-NORTHWEST OF CUSTER CITY, ALONG US HIGHWAY 183, AT A  
FK0261'DIRT ROAD LEADING WEST, ON THE ROAD RIGHT-OF-WAY, IN THE NORTHEAST  
FK0261'CORNER OF SECTION 14, T 14 N, R 17 W. OWNERSHIP--OKLAHOMA DEPARTMENT  
FK0261'OF TRANSPORTATION.

FK0261'TO REACH FROM THE JUNCTION OF US HIGHWAY 183 AND STATE HIGHWAY 33  
EAST

FK0261'(6.5 KM WEST OF CUSTER CITY), GO NORTH ON HIGHWAY 183 FOR 3.36 KM  
FK0261'(2.10 MI) TO A DIRT ROAD LEFT AND STATION ON THE LEFT.

FK0261'STATION MARK IS SET IN THE TOP OF A 30-CM ROUND CONCRETE POST 10 CM  
FK0261'BELOW GROUND. IT IS 16.5 M (54.1 FT) WEST OF, AND SLIGHTLY HIGHER  
FK0261'THAN THE HIGHWAY CENTER, 9.3 M (30.5 FT) SOUTH OF THE DIRT ROAD  
FK0261'CENTER, 1.2 M (3.9 FT) NORTHWEST OF A FENCE CORNER POST, 0.3 M  
FK0261'(1.0 FT) SOUTH OF A METAL WITNESS POST, 7.1 M (23.3 FT)  
FK0261'WEST-SOUTHWEST OF THE TOP CENTER OF A DRAIN UNDER THE ROAD, 0.7 M  
FK0261'(2.3 FT) NORTH OF A FENCE, AND 5.6 M (18.4 FT) EAST OF THE EAST  
FK0261'GATEPOST TO A FIELD ENTRANCE.

FK0261

STATION RECOVERY (1999)

FK0261

FK0261

FK0261'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (CSM)

FK0261'RECOVERED AS DESCRIBED. NOTE--THE STATION IS NOW SURROUNDED BY 3  
FK0261'OKDOT METAL WITNESS POSTS.

FK0261

STATION RECOVERY (2001)

FK0261

FK0261

FK0261'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 2001 (KCH)

FK0261'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING, INC. MSAM 2001  
(KCH)

FK0261'RECOVERED AS DESCRIBED.

FK0261'

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

GH0124 \*\*\*\*\*

## GH0124 DESIGNATION - T 47

GH0124 PID - GH0124

GH0124 STATE/COUNTY- OK/PAWNEE

GH0124 USGS QUAD - PAWNEE (1978)

GH0124

GH0124 \*CURRENT SURVEY CONTROL

GH0124

GH0124\* NAD 83(1986)- 36 20 25. (N) 096 48 15. (W) SCALED

GH0124\* NAVD 88 - 255.736 (meters) 839.03 (feet) ADJUSTED

GH0124

GH0124 GEOID HEIGHT- -28.43 (meters) GEOID09

GH0124 DYNAMIC HT - 255.512 (meters) 838.29 (feet) COMP

GH0124 MODELED GRAV- 979,752.5 (mgal) NAVD 88

GH0124

GH0124 VERT ORDER - SECOND CLASS 0

GH0124

GH0124.The horizontal coordinates were scaled from a topographic map and have

GH0124.an estimated accuracy of +/- 6 seconds.

GH0124

GH0124.The orthometric height was determined by differential leveling and

GH0124.adjusted in June 1991.

GH0124

GH0124.The geoid height was determined by GEOID09.

GH0124

GH0124.The dynamic height is computed by dividing the NAVD 88

GH0124.geopotential number by the normal gravity value computed on the

GH0124.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

GH0124.degrees latitude (g = 980.6199 gals.).

GH0124

GH0124.The modeled gravity was interpolated from observed gravity values.

GH0124

GH0124; North East Units Estimated Accuracy

GH0124;SPC OK N - 149,370. 707,350. MT (+/- 180 meters Scaled)

GH0124

GH0124 SUPERSEDED SURVEY CONTROL

GH0124

GH0124 NGVD 29 (??/??/92) 255.628 (m) 838.67 (f) ADJ UNCH 2 0

GH0124

GH0124.Superseded values are not recommended for survey control.

GH0124.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

GH0124.[See file dsdata.txt](#) to determine how the superseded data were derived.

GH0124

GH0124\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPF970239(NAD 83)

GH0124\_MARKER: DB = BENCH MARK DISK

GH0124\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

GH0124\_SP\_SET: SET IN TOP OF CONCRETE MONUMENT

GH0124\_STAMPING: T-47 1934

GH0124\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

GH0124+STABILITY: SURFACE MOTION

GH0124

GH0124 HISTORY - Date Condition Report By

GH0124 HISTORY - 1934 MONUMENTED CGS

GH0124

GH0124 STATION DESCRIPTION

GH0124

GH0124'DESCRIBED BY COAST AND GEODETIC SURVEY 1934

GH0124'AT PAWNEE.

GH0124'AT PAWNEE, PAWNEE COUNTY, ON THE ST. LOUIS-SAN FRANCISCO RAILWAY,

GH0124'60 FEET NORTH OF THE STATION, 2 FEET SOUTH OF MILEPOST 478,

GH0124'82 FEET SOUTHWEST OF THE SOUTHWEST CORNER OF THE PAWNEE MERCANTILE

GH0124'CO. WAREHOUSE, AND 48 FEET NORTH OF THE CENTERLINE OF THE TRACK.

GH0124'A STANDARD DISK, STAMPED T 47 1934 AND SET IN THE TOP OF A

GH0124'CONCRETE POST.

DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FJ0719 \*\*\*\*\*

**FJ0719 DESIGNATION - D 194**

FJ0719 PID - FJ0719

FJ0719 STATE/COUNTY- OK/LINCOLN

FJ0719 USGS QUAD - LUTHER SE (1983)

FJ0719

FJ0719 \*CURRENT SURVEY CONTROL

FJ0719

---

FJ0719\* NAD 83(2007)- 35 30 26.00240(N) 097 00 02.83022(W) NO CHECK

FJ0719\* NAVD 88 - 304.067 (meters) 997.59 (feet) ADJUSTED

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FJ0719

FJ0719 EPOCH DATE - 2002.00

FJ0719 X - -633,568.480 (meters) COMP

FJ0719 Y - -5,159,415.926 (meters) COMP

FJ0719 Z - 3,683,981.036 (meters) COMP

FJ0719 LAPLACE CORR- -2.09 (seconds) DEFLEC09

FJ0719 ELLIP HEIGHT- 276.638 (meters) (02/10/07) NO CHECK

FJ0719 GEOID HEIGHT- -27.43 (meters) GEOID09

FJ0719 DYNAMIC HT - 303.782 (meters) 996.66 (feet) COMP

FJ0719

FJ0719 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FJ0719 Type	PID	Designation	North	East	Ellip
-------------	-----	-------------	-------	------	-------

FJ0719	-----	-----	-----	-----	-----
FJ0719 NETWORK	FJ0719 D 194		1.29	0.98	3.59

FJ0719

FJ0719 MODELED GRAV- 979,687.4 (mgal) NAVD 88

FJ0719

FJ0719 VERT ORDER - FIRST CLASS II

FJ0719

FJ0719.The horizontal coordinates were established by GPS observations

FJ0719.and adjusted by the National Geodetic Survey in February 2007.

FJ0719

FJ0719.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FJ0719.See [National Readjustment](#) for more information.

FJ0719.No horizontal observational check was made to the station.

FJ0719.The horizontal coordinates are valid at the epoch date displayed above.

FJ0719.The epoch date for horizontal control is a decimal equivalence

FJ0719.of Year/Month/Day.

FJ0719

FJ0719.The orthometric height was determined by differential leveling and

FJ0719.adjusted in August 1994.

FJ0719

FJ0719.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FJ0719

FJ0719.The Laplace correction was computed from DEFLEC09 derived deflections.

FJ0719

FJ0719.The ellipsoidal height was determined by GPS observations

FJ0719.and is referenced to NAD 83.

FJ0719

FJ0719.The geoid height was determined by GEOID09.



FJ0719

FJ0719.The dynamic height is computed by dividing the NAVD 88  
FJ0719.geopotential number by the normal gravity value computed on the  
FJ0719.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
FJ0719.degrees latitude ( $g = 980.6199$  gals.).

FJ0719

FJ0719.The modeled gravity was interpolated from observed gravity values.

FJ0719

FJ0719;	North	East	Units	Scale	Factor	Converg.
FJ0719;SPC OK N	- 56,744.649	690,649.372	MT	1.00001132	+0 35	22.9
FJ0719;SPC OK N	- 186,169.74	2,265,905.48	sFT	1.00001132	+0 35	22.9
FJ0719;UTM 14	- 3,931,132.171	681,310.740	MT	1.00000512	+1 09	41.3

FJ0719

FJ0719! - Elev Factor x Scale Factor = Combined Factor  
FJ0719!SPC OK N -  $0.99995658 \times 1.00001132 = 0.99996790$   
FJ0719!UTM 14 -  $0.99995658 \times 1.00000512 = 0.99996170$

FJ0719

FJ0719 SUPERSEDED SURVEY CONTROL

FJ0719

FJ0719 NAD 83(1993)- 35 30 26.00219(N) 097 00 02.83021(W) AD( ) 1  
FJ0719 ELLIP H (03/07/02) 276.640 (m) GP( ) 4 2  
FJ0719 NAVD 88 (06/15/91) 304.097 (m) 997.69 (f) UNKNOWN 1 2

FJ0719

FJ0719.Superseded values are not recommended for survey control.  
FJ0719.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.  
FJ0719.[See file dsdata.txt](#) to determine how the superseded data were derived.

FJ0719

FJ0719\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPE8131031132(NAD 83)  
FJ0719\_MARKER: I = METAL ROD  
FJ0719\_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL  
FJ0719+WITH SETTING: INFORMATION.  
FJ0719\_SP\_SET: SHALLOW SET METAL ROD  
FJ0719\_STAMPING: D 194 1984  
FJ0719\_MARK LOGO: NGS  
FJ0719\_PROJECTION: FLUSH  
FJ0719\_MAGNETIC: I = MARKER IS A STEEL ROD  
FJ0719\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL  
FJ0719\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
FJ0719+SATELLITE: SATELLITE OBSERVATIONS - May 17, 2001  
FJ0719\_ROD/PIPE-DEPTH: 1.1 meters

FJ0719

FJ0719 HISTORY	- Date	Condition	Report By
FJ0719 HISTORY	- 1984	MONUMENTED	NGS
FJ0719 HISTORY	- 1988	GOOD	USPSQD
FJ0719 HISTORY	- 1989	GOOD	USPSQD
FJ0719 HISTORY	- 1990	GOOD	USPSQD
FJ0719 HISTORY	- 20010517	GOOD	MSAM

FJ0719

FJ0719 STATION DESCRIPTION

FJ0719

FJ0719'DESCRIBED BY NATIONAL GEODETIC SURVEY 1984  
FJ0719'9.2 KM (5.7 MI) WEST FROM MEEKER.  
FJ0719'9.2 KM (5.7 MI) WEST ALONG U.S. HIGHWAY 62 FROM THE POST OFFICE IN  
FJ0719'MEEKER, SET IN THE NORTHWEST QUADRANT OF THE JUNCTION OF HIGHWAY 62  
FJ0719'AND U.S. HIGHWAY 177, 22.4 METERS (73.5 FT) NORTH OF THE CENTERLINE OF  
FJ0719'HIGHWAY 62 WESTBOUND LANES, 30.5 METERS (100.0 FT) WEST OF THE

FJ0719'CENTERLINE OF HIGHWAY 177, AND 0.9 METER (3.0 FT) WEST OF A POWERLINE  
FJ0719'POLE WITH TRANSFORMER AND METER. NOTE, ROD DRIVEN TO REFUSAL AND  
FJ0719'ANCHORED IN HARD SANDSTONE ROCK.

FJ0719'THE MARK IS 0.31 METERS E FROM A WITNESS POST.

FJ0719'THE MARK IS 0.31 M ABOVE HIGHWAY.

FJ0719

FJ0719 STATION RECOVERY (1988)

FJ0719

FJ0719'RECOVERY NOTE BY US POWER SQUADRON 1988 (MS)

FJ0719'RECOVERED IN GOOD CONDITION.

FJ0719

FJ0719 STATION RECOVERY (1989)

FJ0719

FJ0719'RECOVERY NOTE BY US POWER SQUADRON 1989 (MS)

FJ0719'RECOVERED IN GOOD CONDITION.

FJ0719

FJ0719 STATION RECOVERY (1990)

FJ0719

FJ0719'RECOVERY NOTE BY US POWER SQUADRON 1990 (TWS)

FJ0719'RECOVERED IN GOOD CONDITION.

FJ0719

FJ0719 STATION RECOVERY (2001)

FJ0719

FJ0719'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 2001 (KCH)

FJ0719'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING, INC. MSAM 2001

(KCH)

FJ0719'RECOVERED AS DESCRIBED.

FJ0719'

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FJ0463 \*\*\*\*\*

**FJ0463 DESIGNATION - F 186**

FJ0463 PID - FJ0463

FJ0463 STATE/COUNTY- OK/CANADIAN

FJ0463 USGS QUAD - UNION CITY (1981)

FJ0463

FJ0463 \*CURRENT SURVEY CONTROL

FJ0463

FJ0463\* NAD 83(1993)- 35 26 08.14135(N) 097 57 11.88485(W) ADJUSTED

FJ0463\* NAVD 88 - 421.240 (meters) 1382.02 (feet) ADJUSTED

FJ0463

FJ0463 X - -719,901.196 (meters) COMP

FJ0463 Y - -5,152,833.005 (meters) COMP

FJ0463 Z - 3,677,576.739 (meters) COMP

FJ0463 LAPLACE CORR- 0.71 (seconds) DEFLEC09

FJ0463 ELLIP HEIGHT- 394.141 (meters) (11/28/94) ADJUSTED

FJ0463 GEOID HEIGHT- -27.04 (meters) GEOID09

FJ0463 DYNAMIC HT - 420.825 (meters) 1380.66 (feet) COMP

FJ0463 MODELED GRAV- 979,635.0 (mgal) NAVD 88

FJ0463

FJ0463 HORZ ORDER - SECOND

FJ0463 VERT ORDER - FIRST CLASS II

FJ0463 ELLP ORDER - FIFTH CLASS I

FJ0463

FJ0463.The horizontal coordinates were established by GPS observations

FJ0463.and adjusted by the National Geodetic Survey in February 1996.

FJ0463

FJ0463.The orthometric height was determined by differential leveling and

FJ0463.adjusted in June 1991.

FJ0463

FJ0463.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FJ0463

FJ0463.The Laplace correction was computed from DEFLEC09 derived deflections.

FJ0463

FJ0463.The ellipsoidal height was determined by GPS observations

FJ0463.and is referenced to NAD 83.

FJ0463

FJ0463.The geoid height was determined by GEOID09.

FJ0463

FJ0463.The dynamic height is computed by dividing the NAVD 88

FJ0463.geopotential number by the normal gravity value computed on the

FJ0463.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FJ0463.degrees latitude (g = 980.6199 gals.).

FJ0463

FJ0463.The modeled gravity was interpolated from observed gravity values.

FJ0463

FJ0463; North East Units Scale Factor Converg.

FJ0463;SPC OK N - 48,331.959 604,240.431 MT 1.00002638 +0 01 39.2

FJ0463;SPC OK N - 158,569.10 1,982,412.15 sFT 1.00002638 +0 01 39.2

FJ0463;UTM 14 - 3,921,853.786 595,005.807 MT 0.99971123 +0 36 24.9

FJ0463

FJ0463! - Elev Factor x Scale Factor = Combined Factor  
 FJ0463!SPC OK N - 0.99993814 x 1.00002638 = 0.99996452  
 FJ0463!UTM 14 - 0.99993814 x 0.99971123 = 0.99964939

FJ0463

FJ0463 SUPERSEDED SURVEY CONTROL

FJ0463

FJ0463 NAD 83(1993)- 35 26 08.14135(N) 097 57 11.88485(W) AD( ) 2

FJ0463 NAD 83(1986)- 35 26 08.14665(N) 097 57 11.87087(W) AD( ) 2

FJ0463 NGVD 29 (??/??/92) 421.005 (m) 1381.25 (f) ADJ UNCH 1 2

FJ0463

FJ0463.Superseded values are not recommended for survey control.

FJ0463.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FJ0463.[See file dsdata.txt](#) to determine how the superseded data were derived.

FJ0463

FJ0463\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE9500521853(NAD 83)

FJ0463\_MARKER: DB = BENCH MARK DISK

FJ0463\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FJ0463\_SP\_SET: CONCRETE POST

FJ0463\_STAMPING: F 186 1953

FJ0463\_MARK LOGO: CGS

FJ0463\_PROJECTION: PROJECTING 15 CENTIMETERS

FJ0463\_MAGNETIC: N = NO MAGNETIC MATERIAL

FJ0463\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FJ0463+STABILITY: SURFACE MOTION

FJ0463\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FJ0463+SATELLITE: SATELLITE OBSERVATIONS - March 01, 1989

FJ0463

FJ0463 HISTORY - Date Condition Report By

FJ0463 HISTORY - 1953 MONUMENTED CGS

FJ0463 HISTORY - 1986 GOOD NGS

FJ0463 HISTORY - 19890301 GOOD NGS

FJ0463

FJ0463 STATION DESCRIPTION

FJ0463

FJ0463'DESCRIBED BY COAST AND GEODETIC SURVEY 1953

FJ0463'2.9 MI N FROM UNION CITY.

FJ0463'2.9 MILES NORTH ALONG THE CHICAGO, ROCK ISLAND AND PACIFIC

FJ0463'RAILROAD FROM THE STATION AT UNION CITY, AT A ROAD CROSSING,

FJ0463'50 FEET WEST OF THE WEST RAIL, 48 FEET EAST OF A FENCE, 17 FEET

FJ0463'NORTHWEST OF A TELEPHONE POLE, 2 FEET NORTH OF A WITNESS POST,

FJ0463'SET IN THE TOP OF A CONCRETE POST WHICH PROJECTS 0.4 FOOT ABOVE  
 FJ0463'THE GROUND.

FJ0463

FJ0463 STATION RECOVERY (1986)

FJ0463

FJ0463'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1986

FJ0463'RECOVERED IN GOOD CONDITION. A NEW DESCRIPTION FOLLOWS. 7.3 KM (4.55

FJ0463'MI) SOUTHERLY ALONG THE OKLAHOMA KANSAS TEXAS RAILROAD FROM ITS

FJ0463'JUNCTION WITH INTERSTATE HIGHWAY 40 IN EL RENO, 31.5 M (103.3 FT)

FJ0463'NORTH OF THE CENTER OF A DIRT ROAD, 15.2 M (49.9 FT) WEST OF THE NEAR

FJ0463'RAIL, 14.6 M (47.9 FT) EAST OF A FENCE, AND 5.2 M (17.1 FT) NORTHWEST

FJ0463'OF A UTILITY POLE.

FJ0463'THE MARK IS 0.3 METERS S FROM A WITNESS POST

FJ0463

FJ0463 STATION RECOVERY (1989)

FJ0463

FJ0463'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1989

FJ0463'THE STATION WAS RECOVERED IN GOOD CONDITION, A NEW DESCRIPTION

FJ0463'FOLLOWS.

FJ0463'THE STATION IS LOCATED ABOUT 7.5 KM (4.65 MI) SOUTH OF EL RENO, 5.0 KM

FJ0463'(3.10 MI) NORTHWEST OF UNION CITY, AND 1.5 KM (0.95 MI) WEST OF U.S.

FJ0463'HIGHWAY 81. OWNERSHIP--CANADIAN COUNTY.

FJ0463'TO REACH THE STATION FROM THE JUNCTION OF INTERSTATE HIGHWAY 40 AND

FJ0463'U.S. HIGHWAY 81 IN SOUTHEAST EL RENO, GO SOUTH ON HIGHWAY 81 FOR 7.4

FJ0463'KM (4.60 MI) TO A GRAVELED CROSSROAD. TURN RIGHT AND GO WEST ON THE

FJ0463'GRAVELED ROAD FOR 1.5 KM (0.95 MI) TO THE STATION ON THE RIGHT, JUST

FJ0463'AFTER CROSSING THE CHICAGO, ROCK ISLAND AND PACIFIC RAILROAD.

FJ0463'THE STATION IS A STANDARD CGS DISK SET IN THE TOP OF A 30 CM ROUND

FJ0463'CONCRETE POST THAT PROJECTS 20 CM ABOVE THE GROUND. LOCATED 32.1 M

FJ0463'(105.3 FT) NORTH OF THE CENTER OF THE ROAD, 15.2 M (49.9 FT) WEST OF

FJ0463'THE NEAR RAIL, 12.4 M (40.7 FT) EAST OF A FENCE, 4.7 M (15.4 FT)

FJ0463'NORTHWEST OF A UTILITY POLE, AND 0.3 M (1.0 FT) SOUTH OF A CARSONITE

FJ0463'WITNESS POST.

FJ0463'DESCRIBED BY E.J. HANSMANN, TYPED BY RLZ.

DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0651 \*\*\*\*\*

## FK0651 DESIGNATION - N 216

FK0651 PID - FK0651

FK0651 STATE/COUNTY- OK/CADDO

FK0651 USGS QUAD - COGAR SE (1968)

FK0651

FK0651 \*CURRENT SURVEY CONTROL

FK0651

FK0651\* NAD 83(1986)- 35 20 02. (N) 098 06 48. (W) SCALED

FK0651\* NAVD 88 - 451.781 (meters) 1482.22 (feet) ADJUSTED

FK0651

FK0651 GEOID HEIGHT- -27.04 (meters) GEOID09

FK0651 DYNAMIC HT - 451.328 (meters) 1480.73 (feet) COMP

FK0651 MODELED GRAV- 979,618.0 (mgal) NAVD 88

FK0651

FK0651 VERT ORDER - FIRST CLASS II

FK0651

FK0651.The horizontal coordinates were scaled from a topographic map and have

FK0651.an estimated accuracy of +/- 6 seconds.

FK0651

FK0651.The orthometric height was determined by differential leveling and

FK0651.adjusted in August 1994.

FK0651

FK0651.The geoid height was determined by GEOID09.

FK0651

FK0651.The dynamic height is computed by dividing the NAVD 88

FK0651.geopotential number by the normal gravity value computed on the

FK0651.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0651.degrees latitude (g = 980.6199 gals.).

FK0651

FK0651.The modeled gravity was interpolated from observed gravity values.

FK0651

FK0651; North East Units Estimated Accuracy

FK0651;SPC OK S - 221,920. 589,700. MT (+/- 180 meters Scaled)

FK0651

FK0651 SUPERSEDED SURVEY CONTROL

FK0651

FK0651.No superseded survey control is available for this station.

FK0651

FK0651\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE805104(NAD 83)

FK0651\_MARKER: I = METAL ROD

FK0651\_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL  
FK0651+WITH SETTING: INFORMATION.

FK0651\_SP\_SET: METAL ROD DRIVEN INTO GROUND

FK0651\_STAMPING: N 216 1994

FK0651\_MARK LOGO: NGS

FK0651\_MAGNETIC: I = MARKER IS A STEEL ROD

FK0651\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

FK0651\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0651+SATELLITE: SATELLITE OBSERVATIONS - 1994

FK0651

FK0651 HISTORY - Date Condition Report By  
FK0651 HISTORY - 1994 MONUMENTED NGS

FK0651

FK0651 STATION DESCRIPTION

FK0651

FK0651'DESCRIBED BY NATIONAL GEODETIC SURVEY 1994

FK0651'0.1 KM (0.05 MI) EASTERLY ALONG MAIN STREET FROM THE POST OFFICE IN

FK0651'MINCO, THENCE 2.3 KM (1.40 MI) NORTHERLY ALONG U.S. HIGHWAY 81,

FK0651'THENCE 15.7 KM (9.75 MI) WESTERLY ALONG STATE HIGHWAY 152, A METAL

FK0651'ROD DRIVEN 2.1 METERS AND FLUSH WITH THE GROUND, 33.5 M

FK0651'(109.9 FT) EAST OF THE CENTER OF A GRAVELED ROAD, 17.8 KM (11.05 MI)

FK0651'SOUTH OF THE HIGHWAY CENTERLINE, 6.4 M (21.0 FT) EAST OF THE CENTER OF

FK0651'A GATE, 0.7 M (2.3 FT) BELOW THE LEVEL OF THE HIGHWAY, AND 0.6 M

FK0651'(2.0 FT) NORTH OF A WITNESS POST AND FENCE. NOTE--ACCESS TO THE

FK0651'DATUM POINT IS THROUGH A 5-INCH LOGO CAP. THE ROD WAS DRIVEN TO

FK0651'REFUSAL AND ANCHORED.

DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0151 \*\*\*\*\*

## FK0151 DESIGNATION - J 28

FK0151 PID - FK0151

FK0151 STATE/COUNTY- OK/WASHITA

FK0151 USGS QUAD - CORDELL (1983)

FK0151

FK0151 \*CURRENT SURVEY CONTROL

FK0151

FK0151\* NAD 83(1993)- 35 18 21.27092(N) 098 59 48.94497(W) ADJUSTED

FK0151\* NAVD 88 - 479.002 (meters) 1571.53 (feet) ADJUSTED

FK0151

FK0151 X - -814,944.068 (meters) COMP

FK0151 Y - -5,147,139.783 (meters) COMP

FK0151 Z - 3,665,876.899 (meters) COMP

FK0151 LAPLACE CORR- 1.08 (seconds) DEFLEC09

FK0151 ELLIP HEIGHT- 452.070 (meters) (11/28/94) ADJUSTED

FK0151 GEOID HEIGHT- -26.85 (meters) GEOID09

FK0151 DYNAMIC HT - 478.516 (meters) 1569.93 (feet) COMP

FK0151 MODELED GRAV- 979,605.2 (mgal) NAVD 88

FK0151

FK0151 HORZ ORDER - SECOND

FK0151 VERT ORDER - SECOND CLASS 0

FK0151 ELLP ORDER - FIFTH CLASS I

FK0151

FK0151.The horizontal coordinates were established by GPS observations

FK0151.and adjusted by the National Geodetic Survey in November 1994.

FK0151

FK0151.The orthometric height was determined by differential leveling and

FK0151.adjusted in June 1991.

FK0151

FK0151.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0151

FK0151.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0151

FK0151.The ellipsoidal height was determined by GPS observations

FK0151.and is referenced to NAD 83.

FK0151

FK0151.The geoid height was determined by GEOID09.

FK0151

FK0151.The dynamic height is computed by dividing the NAVD 88

FK0151.geopotential number by the normal gravity value computed on the

FK0151.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0151.degrees latitude (g = 980.6199 gals.).

FK0151

FK0151.The modeled gravity was interpolated from observed gravity values.

FK0151



FK0151; North East Units Scale Factor Converg.  
 FK0151;SPC OK S - 219,261.011 509,332.261 MT 1.00001515 -0 33 57.1  
 FK0151;SPC OK S - 719,358.83 1,671,034.26 sFT 1.00001515 -0 33 57.1  
 FK0151;UTM 14 - 3,906,968.026 500,279.173 MT 0.99960000 +0 00 06.4  
 FK0151  
 FK0151! - Elev Factor x Scale Factor = Combined Factor  
 FK0151!SPC OK S - 0.99992905 x 1.00001515 = 0.99994420  
 FK0151!UTM 14 - 0.99992905 x 0.99960000 = 0.99952908  
 FK0151  
 FK0151 SUPERSEDED SURVEY CONTROL  
 FK0151  
 FK0151 NAD 83(1986)- 35 18 21.27680(N) 098 59 48.93400(W) AD( ) 2  
 FK0151 NGVD 29 (??/??/92) 478.790 (m) 1570.83 (f) ADJ UNCH 2 0  
 FK0151  
 FK0151.Superseded values are not recommended for survey control.  
 FK0151.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.  
 FK0151.[See file dsdata.txt](#) to determine how the superseded data were derived.  
 FK0151  
 FK0151\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE0027906968(NAD 83)  
 FK0151\_MARKER: DB = BENCH MARK DISK  
 FK0151\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT  
 FK0151\_SP\_SET: CONCRETE POST  
 FK0151\_STAMPING: J 28 1934  
 FK0151\_MARK LOGO: CGS  
 FK0151\_MAGNETIC: N = NO MAGNETIC MATERIAL  
 FK0151\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO  
 FK0151+STABILITY: SURFACE MOTION  
 FK0151\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
 FK0151+SATELLITE: SATELLITE OBSERVATIONS - March 01, 1989  
 FK0151  
 FK0151 HISTORY - Date Condition Report By  
 FK0151 HISTORY - 1934 MONUMENTED CGS  
 FK0151 HISTORY - 1937 GOOD NGS  
 FK0151 HISTORY - 19890301 GOOD NGS  
 FK0151 HISTORY - 19970409 GOOD OKDOT  
 FK0151  
 FK0151 STATION DESCRIPTION  
 FK0151  
 FK0151'DESCRIBED BY NATIONAL GEODETIC SURVEY 1937  
 FK0151'1.1 MI N FROM CORDELL.  
 FK0151'1.1 MILES NORTH ALONG THE ST. LOUIS-SAN FRANCISCO RAILWAY FROM  
 FK0151'THE STATION AT CORDELL, 0.2 MILE EAST OF A FARMHOUSE, AT A  
 FK0151'CROSSING, 30 FEET EAST OF THE TRACK, 20 FEET NORTH OF THE  
 FK0151'CENTERLINE OF THE ROAD, AND ON THE RAILROAD RIGHT-OF-WAY. A  
 FK0151'STANDARD DISK, STAMPED J 28 1934 AND SET IN THE TOP OF A CONCRETE  
 FK0151'POST.  
 FK0151  
 FK0151 STATION RECOVERY (1989)  
 FK0151  
 FK0151'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1989  
 FK0151'THE STATION WAS RECOVERED IN GOOD CONDITION, A NEW DESCRIPTION  
 FK0151'FOLLOWS.  
 FK0151'THE STATION IS LOCATED ABOUT 19.0 KM (11.80 MI) SOUTH OF CLINTON, 12.2  
 FK0151'KM (7.60 MI) EAST-NORTHEAST OF DILL CITY, AND 1.6 KM (1.00 MI) NORTH  
 FK0151'OF CORDELL. OWNERSHIP--CITY OF CORDELL.  
 FK0151'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAY 183 AND STATE

FK0151 HIGHWAY 152 IN CORDELL, GO NORTH ON HIGHWAY 183 FOR 1.6 KM (1.00 MI)  
FK0151 TO A CROSS STREET. TURN LEFT AND GO WEST ON EAST 14TH STREET FOR 0.9  
FK0151 KM (0.55 MI) TO THE STATION ON THE RIGHT, JUST BEFORE CROSSING THE  
FK0151 BURLINGTON NORTHERN RAILROAD.

FK0151 THE STATION IS A STANDARD CGS DISK SET IN THE TOP OF A 30 CM SQUARE  
FK0151 CONCRETE POST THAT PROJECTS 20 CM ABOVE THE GROUND. LOCATED 12.8 M  
FK0151 (42.0 FT) EAST OF THE NEAR RAIL, 10.2 M (33.5 FT) NORTH OF THE CENTER  
FK0151 OF THE STREET, 9.2 M (30.2 FT) NORTHEAST OF A RAILROAD CROSSING  
FK0151 SIGNPOST, AND 0.4 M (1.3 FT) NORTH OF A METAL WITNESS POST.  
FK0151 DESCRIBED BY E.J. HANSMANN, TYPED BY RLZ.

FK0151

STATION RECOVERY (1997)

FK0151

FK0151

FK0151 RECOVERY NOTE BY OKLAHOMA DEPARTMENT OF TRANSPORTATION 1997 (LDR)  
FK0151 RECOVERED IN GOOD CONDITION. NOTE--THE MARK IS 1.0 FOOT (0.3 M) SOUTH  
FK0151 OF A STEEL WITNESS POST.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

EL0510 \*\*\*\*\*

**EL0510 DESIGNATION - C 155**

EL0510 PID - EL0510

EL0510 STATE/COUNTY- OK/STEPHENS

EL0510 USGS QUAD - HARRISBURG (1976)

EL0510

EL0510 \*CURRENT SURVEY CONTROL

EL0510

EL0510\* NAD 83(1993)- 34 29 33.19059(N) 097 51 56.99531(W) ADJUSTED

EL0510\* NAVD 88 - 338.279 (meters) 1109.84 (feet) ADJUSTED

EL0510

EL0510 LAPLACE CORR- -0.87 (seconds) DEFLECO9

EL0510 GEOID HEIGHT- -25.83 (meters) GEOID09

EL0510 DYNAMIC HT - 337.930 (meters) 1108.69 (feet) COMP

EL0510 MODELED GRAV- 979,593.5 (mgal) NAVD 88

EL0510

EL0510 HORZ ORDER - SECOND

EL0510 VERT ORDER - SECOND CLASS 0

EL0510

EL0510.The horizontal coordinates were established by classical geodetic methods

EL0510.and adjusted by the National Geodetic Survey in November 1994.

EL0510

EL0510.The orthometric height was determined by differential leveling and

EL0510.adjusted in June 1991.

EL0510

EL0510.The Laplace correction was computed from DEFLECO9 derived deflections.

EL0510

EL0510.The geoid height was determined by GEOID09.

EL0510

EL0510.The dynamic height is computed by dividing the NAVD 88

EL0510.geopotential number by the normal gravity value computed on the

EL0510.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

EL0510.degrees latitude (g = 980.6199 gals.).

EL0510

EL0510.The modeled gravity was interpolated from observed gravity values.

EL0510

EL0510; North East Units Scale Factor Converg.

EL0510;SPC OK S - 128,592.478 612,322.302 MT 0.99993722 +0 04 34.2

EL0510;SPC OK S - 421,890.49 2,008,927.42 sFT 0.99993722 +0 04 34.2

EL0510;UTM 14 - 3,817,355.165 604,132.018 MT 0.99973365 +0 38 32.4

EL0510

EL0510! - Elev Factor x Scale Factor = Combined Factor

EL0510!SPC OK S - 0.99995096 x 0.99993722 = 0.99988818

EL0510!UTM 14 - 0.99995096 x 0.99973365 = 0.99968462

EL0510

EL0510 SUPERSEDED SURVEY CONTROL

EL0510

EL0510 NAD 83(1986)- 34 29 33.19444(N) 097 51 56.98098(W) AD( ) 2

EL0510 NAD 27 - 34 29 32.90326(N) 097 51 55.85964(W) AD( ) 2

EL0510 NGVD 29 (??/??/92) 338.192 (m) 1109.55 (f) ADJ UNCH 2 0

EL0510

EL0510.Superseded values are not recommended for survey control.

EL0510.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

EL0510.[See file dsdata.txt](#) to determine how the superseded data were derived.

EL0510

EL0510\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPD0413217355(NAD 83)

EL0510\_MARKER: DB = BENCH MARK DISK

EL0510\_SETTING: 36 = SET IN A MASSIVE STRUCTURE

EL0510\_SP\_SET: BRIDGE

EL0510\_STAMPING: C 155 1934

EL0510\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

EL0510

EL0510 HISTORY - Date Condition Report By

EL0510 HISTORY - 1934 MONUMENTED CGS

EL0510 HISTORY - 1966 GOOD NGS

EL0510

EL0510 STATION DESCRIPTION

EL0510

EL0510'DESCRIBED BY NATIONAL GEODETIC SURVEY 1966

EL0510'5 MI E FROM DUNCAN.

EL0510'TO REACH FROM THE JUNCTION OF U.S. HIGHWAY 81 WITH STATE HIGHWAY

EL0510'7 IN THE SOUTH EDGE OF DUNCAN, GO EAST ON HIGHWAY 7 FOR 2.1 MILES

EL0510'TO A JUNCTION WITH BUSINESS ROUTE 7. CONTINUE EAST ON HIGHWAY

EL0510'7 FOR 3.05 MILES TO A CROSSROAD. CONTINUE AHEAD EAST ON HIGHWAY

EL0510'7 FOR 0.6 MILE TO A CONCRETE BRIDGE AND THE MARK IN THE SOUTHEAST

EL0510'WINGWALL OF THE CONCRETE BRIDGE.

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

AJ8118 \*\*\*\*\*

AJ8118 PACS - This is a Primary Airport Control Station.

**AJ8118 DESIGNATION - CSM A 2001**

AJ8118 PID - AJ8118

AJ8118 STATE/COUNTY- OK/WASHITA

AJ8118 USGS QUAD - DILL CITY (1983)

AJ8118

AJ8118 \*CURRENT SURVEY CONTROL

AJ8118

AJ8118\* NAD 83(2007)- 35 21 05.05315(N) 099 11 55.46198(W) ADJUSTED

AJ8118\* NAVD 88 - 582.71 (meters) 1911.8 (feet) GPS OBS

AJ8118

AJ8118 EPOCH DATE - 2002.00

AJ8118 X - -832,615.381 (meters) COMP

AJ8118 Y - -5,141,439.335 (meters) COMP

AJ8118 Z - 3,670,055.133 (meters) COMP

AJ8118 LAPLACE CORR- 0.41 (seconds) DEFLEC09

AJ8118 ELLIP HEIGHT- 555.646 (meters) (02/10/07) ADJUSTED

AJ8118 GEOID HEIGHT- -27.06 (meters) GEOID09

AJ8118

AJ8118 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

AJ8118 Type PID Designation North East Ellip

AJ8118 -----

AJ8118 NETWORK AJ8118 CSM A 2001 1.04 1.67 2.70

AJ8118 -----

AJ8118

AJ8118.This mark is at Clinton Sherman Airport (CSM)

AJ8118

AJ8118.The horizontal coordinates were established by GPS observations

AJ8118.and adjusted by the National Geodetic Survey in February 2007.

AJ8118

AJ8118.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AJ8118.See [National Readjustment](#) for more information.

AJ8118.The horizontal coordinates are valid at the epoch date displayed above.

AJ8118.The epoch date for horizontal control is a decimal equivalence

AJ8118.of Year/Month/Day.

AJ8118

AJ8118.The orthometric height was determined by GPS observations and a

AJ8118.high-resolution geoid model.

AJ8118

AJ8118.GPS derived orthometric heights for airport stations designated as

AJ8118.PACS or SACS are published to 2 decimal places. This maintains

AJ8118.centimeter relative accuracy between the PACS and SACS. It does

AJ8118.not indicate centimeter accuracy relative to other marks which are

AJ8118.part of the NAVD 88 network.

AJ8118

AJ8118.[Photographs](#) are available for this station.

AJ8118

AJ8118.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AJ8118

AJ8118.The Laplace correction was computed from DEFLEC09 derived deflections.

AJ8118

AJ8118.The ellipsoidal height was determined by GPS observations

AJ8118.and is referenced to NAD 83.

AJ8118

AJ8118.The geoid height was determined by GEOID09.

AJ8118

AJ8118; North East Units Scale Factor Converg.

AJ8118;SPC OK S - 224,507.898 491,038.949 MT 1.00002547 -0 40 49.5

AJ8118;SPC OK S - 736,573.00 1,611,016.95 sFT 1.00002547 -0 40 49.5

AJ8118;UTM 14 - 3,912,031.645 481,942.558 MT 0.99960402 -0 06 54.0

AJ8118

AJ8118! - Elev Factor x Scale Factor = Combined Factor

AJ8118!SPC OK S - 0.99991279 x 1.00002547 = 0.99993826

AJ8118!UTM 14 - 0.99991279 x 0.99960402 = 0.99951685

AJ8118

#### SUPERSEDED SURVEY CONTROL

AJ8118

AJ8118 NAD 83(1993)- 35 21 05.05285(N) 099 11 55.46165(W) AD( ) B

AJ8118 ELLIP H (03/07/02) 555.657 (m) GP( ) 4 2

AJ8118

AJ8118.Superseded values are not recommended for survey control.

AJ8118.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AJ8118.[See file dsdata.txt](#) to determine how the superseded data were derived.

AJ8118

AJ8118\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME8194212031(NAD 83)

AJ8118\_MARKER: I = METAL ROD

AJ8118\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

AJ8118\_STAMPING: CSM A 2001

AJ8118\_MARK LOGO: NGS

AJ8118\_PROJECTION: FLUSH

AJ8118\_MAGNETIC: I = MARKER IS A STEEL ROD

AJ8118\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

AJ8118\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AJ8118+SATELLITE: SATELLITE OBSERVATIONS - December 14, 2005

AJ8118\_ROD/PIPE-DEPTH: 15.2 meters

AJ8118\_SLEEVE-DEPTH : 0.9 meters

AJ8118

AJ8118 HISTORY - Date Condition Report By

AJ8118 HISTORY - 20010601 MONUMENTED MSAM

AJ8118 HISTORY - 20051214 GOOD AFFSA

AJ8118

#### STATION DESCRIPTION

AJ8118

AJ8118'DESCRIBED BY MOUNTAIN SURVEYING AND MAPPING INC 2001 (KCH)

AJ8118'DESCRIBED BY MOUNTAIN SURVEYING AND MAPPING, INC. 2001 (KCH)

AJ8118'THE STATION IS LOCATED ABOUT 27.4 KM (17 MI) SOUTHWEST OF CLINTON,

AJ8118'OKLAHOMA AND 19.3 KM

AJ8118'(12 MI) SOUTHEAST OF ELK CITY, OK. THE STATION IS LOCATED AT THE

AJ8118'CLINTON-SHERMAN

AJ8118'AIRPORT. IT IS IN THE CENTER OF THE AIRPORT, NORTH OF TAXIWAY 3, WEST

AJ8118'OF THE

AJ8118'RAMP AND EAST OF RUNWAY 36L-17R. THIS IS A CONTROLLED AIRPORT.

AJ8118'PERMISSION TO USE THIS

AJ8118'STATION MUST BE OBTAINED FROM THE AIRPORT MANAGER. CONTACT GARY

AJ8118'GORSHING AT

AJ8118'580-562-4882. OWNERSHIP-CLINTON-SHERMAN AIRPORT.

AJ8118'

AJ8118'TO REACH THE STATION FROM THE INTERCHANGE OF INTERSTATE HIGHWAY 40

AJ8118'(EXIT 66) AND

AJ8118'STATE HIGHWAY 183 SOUTH OF CLINTON, OKLAHOMA, GO 20.9 KM (13 MI) WEST

AJ8118'ON INTERSTATE

AJ8118'HIGHWAY 40 TO EXIT 53. EXIT THE INTERSTATE TO THE RIGHT. TURN LEFT,

AJ8118'SOUTH, FOR 9.3 KM

AJ8118'(5.8 MI) ON STATE ROUTE 44 TO SOONER DRIVE. TURN RIGHT, WEST, FOR 2.4

AJ8118'KM (1.5 MI) TO

AJ8118'FIRST STREET. TURN LEFT, SOUTH FOR 0.4 KM (0.25 MI), KEEP TO THE RIGHT

AJ8118'OF THE AIRPORT

AJ8118'TERMINAL BUILDING AND A GATE ON THE EAST SIDE OF THE BUILDING. GO

AJ8118'THROUGH THE GATE, TURN

AJ8118'RIGHT, WEST ON THE APRON FOR 0.15 KM (0.1 MI) PASS THE FIRE STATION

AJ8118'AND TO THE STATION

AJ8118'ON THE RIGHT.

AJ8118'

AJ8118'THE MARK IS A PUNCH HOLE, TOP CENTER ON A STAINLESS STEEL ROD DRIVEN

AJ8118'TO A

AJ8118'DEPTH OF 15.24 M (50 FT), ENCASED IN A 0.9 M (3.0 FT) LONG FINNED

AJ8118'GREASED SLEEVE,

AJ8118'ENCLOSED IN A PVC PIPE WITH LOGO LID, SURROUNDED BY A CONCRETE COLLAR

AJ8118'FLUSH WITH

AJ8118'THE GROUND. THE SLEEVE DEPTH DOES NOT MEET THE SPECIFICATIONS FOR A

AJ8118'CLASS A MARK.

AJ8118'IT IS 71.1 M (233.3 FT) NORTH OF A TAXIWAY LIGHT IN THE CENTERLINE OF

AJ8118'TAXIWAY 3,

AJ8118'59.3 M (194.6 FT) WEST OF A TAXIWAY LIGHT IN THE CENTERLINE OF THE

AJ8118'APRON, 49.0 M

AJ8118'(160.8 FT) WEST OF THE WEST EDGE OF THE APRON AND IN LINE WITH THE

AJ8118'SOUTHERN MOST

AJ8118'GARAGE DOOR OF THE FIRE DEPARTMENT, 0.3 M (1 FT) NORTH OF A CARSONITE

AJ8118'WITNESS POST

AJ8118'AND 0.3 M SOUTH OF A CARSONITE WITNESS POST. THIS STATION IS

AJ8118'DESIGNATED AS A

AJ8118'PRIMARY AIRPORT CONTROL STATION.

AJ8118'

AJ8118'

AJ8118

AJ8118 STATION RECOVERY (2005)

AJ8118

AJ8118'RECOVERY NOTE BY US AIR FORCE FLIGHT STANDARDS AGENCY 2005 (WH)

AJ8118'RECOVERED IN GOOD CONDITION.

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

AJ8119 \*\*\*\*\*

AJ8119 SACS - This is a Secondary Airport Control Station.

## AJ8119 DESIGNATION - CSM B 2001

AJ8119 PID - AJ8119

AJ8119 STATE/COUNTY- OK/WASHITA

AJ8119 USGS QUAD - DILL CITY (1983)

AJ8119

AJ8119 \*CURRENT SURVEY CONTROL

AJ8119

AJ8119\* NAD 83(2007)- 35 21 29.32038(N) 099 11 52.55204(W) ADJUSTED

AJ8119\* NAVD 88 - 584.45 (meters) 1917.5 (feet) GPS OBS

AJ8119

AJ8119 EPOCH DATE - 2002.00

AJ8119 X - -832,473.891 (meters) COMP

AJ8119 Y - -5,141,025.240 (meters) COMP

AJ8119 Z - 3,670,666.144 (meters) COMP

AJ8119 LAPLACE CORR- 0.39 (seconds) DEFLECO9

AJ8119 ELLIP HEIGHT- 557.366 (meters) (02/10/07) ADJUSTED

AJ8119 GEOID HEIGHT- -27.08 (meters) GEOID09

AJ8119

AJ8119 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

AJ8119 Type PID Designation North East Ellip

AJ8119 -----

AJ8119 NETWORK AJ8119 CSM B 2001 1.33 1.78 2.82

AJ8119 -----

AJ8119

AJ8119.This mark is at Clinton Sherman Airport (CSM)

AJ8119

AJ8119.The horizontal coordinates were established by GPS observations

AJ8119.and adjusted by the National Geodetic Survey in February 2007.

AJ8119

AJ8119.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AJ8119.See [National Readjustment](#) for more information.

AJ8119.The horizontal coordinates are valid at the epoch date displayed above.

AJ8119.The epoch date for horizontal control is a decimal equivalence

AJ8119.of Year/Month/Day.

AJ8119

AJ8119.The orthometric height was determined by GPS observations and a

AJ8119.high-resolution geoid model.

AJ8119

AJ8119.GPS derived orthometric heights for airport stations designated as

AJ8119.PACS or SACS are published to 2 decimal places. This maintains

AJ8119.centimeter relative accuracy between the PACS and SACS. It does

AJ8119.not indicate centimeter accuracy relative to other marks which are

AJ8119.part of the NAVD 88 network.

AJ8119

AJ8119.[Photographs](#) are available for this station.

AJ8119

AJ8119.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AJ8119



AJ8119.The Laplace correction was computed from DEFLEC09 derived deflections.

AJ8119

AJ8119.The ellipsoidal height was determined by GPS observations

AJ8119.and is referenced to NAD 83.

AJ8119

AJ8119.The geoid height was determined by GEOID09.

AJ8119

AJ8119; North East Units Scale Factor Converg.

AJ8119;SPC OK S - 225,254.876 491,121.294 MT 1.00002705 -0 40 47.9

AJ8119;SPC OK S - 739,023.71 1,611,287.11 sFT 1.00002705 -0 40 47.9

AJ8119;UTM 14 - 3,912,779.084 482,017.496 MT 0.99960398 -0 06 52.3

AJ8119

AJ8119! - Elev Factor x Scale Factor = Combined Factor

AJ8119!SPC OK S - 0.99991252 x 1.00002705 = 0.99993957

AJ8119!UTM 14 - 0.99991252 x 0.99960398 = 0.99951654

AJ8119

AJ8119 SUPERSEDED SURVEY CONTROL

AJ8119

AJ8119 NAD 83(1993)- 35 21 29.32008(N) 099 11 52.55171(W) AD( ) 1

AJ8119 ELLIP H (03/07/02) 557.377 (m) GP( ) 4 2

AJ8119

AJ8119.Superseded values are not recommended for survey control.

AJ8119.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AJ8119.[See file dsdata.txt](#) to determine how the superseded data were derived.

AJ8119

AJ8119\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME8201712779(NAD 83)

AJ8119\_MARKER: DH = HORIZONTAL CONTROL DISK

AJ8119\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AJ8119\_STAMPING: CSM B 2001

AJ8119\_MARK LOGO: NGS

AJ8119\_PROJECTION: FLUSH

AJ8119\_MAGNETIC: N = NO MAGNETIC MATERIAL

AJ8119\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AJ8119+STABILITY: SURFACE MOTION

AJ8119\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AJ8119+SATELLITE: SATELLITE OBSERVATIONS - June 01, 2001

AJ8119

AJ8119 HISTORY - Date Condition Report By

AJ8119 HISTORY - 20010601 MONUMENTED MSAM

AJ8119

AJ8119 STATION DESCRIPTION

AJ8119

AJ8119'DESCRIBED BY MOUNTAIN SURVEYING AND MAPPING INC 2001 (KCH)

AJ8119'DESCRIBED BY MOUNTAIN SURVEYING AND MAPPING, INC. 2001 (KCH)

AJ8119'THE STATION IS LOCATED ABOUT 27.4 KM (17 MI) SOUTHWEST OF CLINTON,

AJ8119'OKLAHOMA AND 19.3 KM (12 MI)

AJ8119'SOUTHEAST OF ELK CITY, OK. THE STATION IS LOCATED AT THE

AJ8119'CLINTON-SHERMAN AIRPORT. IT IS IN THE

AJ8119'NORTH END OF THE AIRPORT, WEST AND SOUTH OF TAXIWAY A, AND EAST OF

AJ8119'RUNWAY 35L-17R. THIS

AJ8119'IS A CONTROLLED AIRPORT. PERMISSION TO USE THIS STATION MUST BE

AJ8119'OBTAINED FROM THE AIRPORT

AJ8119'MANAGER. CONTACT GARY GORSHING AT 580-562-4882.

AJ8119'OWNERSHIP-CLINTON-SHERMAN AIRPORT.

AJ8119'

AJ8119'TO REACH THE STATION FROM THE INTERCHANGE OF INTERSTATE HIGHWAY 40

AJ8119'(EXIT 66) AND  
AJ8119'STATE HIGHWAY 183 SOUTH OF CLINTON, OKLAHOMA, GO 20.9 KM (13 MI) WEST  
AJ8119'ON INTERSTATE  
AJ8119'HIGHWAY 40 TO EXIT 53. EXIT THE INTERSTATE TO THE RIGHT. TURN LEFT,  
AJ8119'SOUTH, FOR 9.3 KM  
AJ8119'(5.8 MI) ON STATE ROUTE 44 TO SOONER DRIVE. TURN RIGHT, WEST, FOR 2.4  
AJ8119'KM (1.5 MI) TO  
AJ8119'FIRST STREET. TURN LEFT, SOUTH FOR 0.4 KM (0.25 MI), KEEP TO THE RIGHT  
AJ8119'OF THE AIRPORT  
AJ8119'TERMINAL BUILDING AND A GATE ON THE EAST SIDE OF THE BUILDING. GO  
AJ8119'THROUGH THE GATE, TURN  
AJ8119'RIGHT, WEST ON THE APRON FOR 0.15 KM (0.1 MI) PASS THE FIRE STATION.  
AJ8119'TURN RIGHT, NORTEAST,  
AJ8119'ON THE RAMP FOR 0.15 KM (0.1 MI). TURN LEFT, NORTHWEST, ON THE RAMP  
AJ8119'FOR 0.1 KM (0.05 MI)  
AJ8119'TO THE STATION ON THE LEFT.  
AJ8119'  
AJ8119'THE MARK IS A NGS BRASS HORIZONTAL CONTROL DISK SET IN THE TOP CENTER  
AJ8119'OF A CONCRETE POST FLUSH  
AJ8119'WITH THE GROUND. IT IS IN LINE WITH TWO TAXIWAY LIGHTS, 60.9 M (199.8  
AJ8119'FT ) SOUTH OF THE ONE ON  
AJ8119'THE NORTH SIDE OF TAXIWAY A, 32.2 M (105.6 FT) SOUTH OF THE TAXIWAY  
AJ8119'LIGHT IN THE CENTERLINE OF  
AJ8119'TAXIWAY A, 20.0 M (65.6 FT) SOUTH OF THE SOUTH EDGE OF TAXIWAY A, 0.3  
AJ8119'M (1 FT) NORTH OF A  
AJ8119'CARSONITE WITNESS POST AND 0.3M (1 FT) SOUTH OF A CARSONITE WITNESS  
AJ8119'POST. THIS STATION IS  
AJ8119'DESIGNATED AS A SECONDARY AIRPORT CONTROL STATION.  
AJ8119'  
AJ8119'  
AJ8119'

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The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0153 \*\*\*\*\*

## FK0153 DESIGNATION - L 28

FK0153 PID - FK0153

FK0153 STATE/COUNTY- OK/WASHITA

FK0153 USGS QUAD - CORDELL (1983)

FK0153

FK0153 \*CURRENT SURVEY CONTROL

FK0153

FK0153\* NAD 83(1986)- 35 17 27. (N) 098 59 22. (W) SCALED

FK0153\* NAVD 88 - 475.993 (meters) 1561.65 (feet) ADJUSTED

FK0153

FK0153 GEOID HEIGHT- -26.81 (meters) GEOID09

FK0153 DYNAMIC HT - 475.511 (meters) 1560.07 (feet) COMP

FK0153 MODELED GRAV- 979,606.8 (mgal) NAVD 88

FK0153

FK0153 VERT ORDER - SECOND CLASS 0

FK0153

FK0153.The horizontal coordinates were scaled from a topographic map and have

FK0153.an estimated accuracy of +/- 6 seconds.

FK0153

FK0153.The orthometric height was determined by differential leveling and

FK0153.adjusted in June 1991.

FK0153

FK0153.The geoid height was determined by GEOID09.

FK0153

FK0153.The dynamic height is computed by dividing the NAVD 88

FK0153.geopotential number by the normal gravity value computed on the

FK0153.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0153.degrees latitude (g = 980.6199 gals.).

FK0153

FK0153.The modeled gravity was interpolated from observed gravity values.

FK0153

FK0153; North East Units Estimated Accuracy

FK0153;SPC OK S - 217,580. 510,000. MT (+/- 180 meters Scaled)

FK0153

FK0153 SUPERSEDED SURVEY CONTROL

FK0153

FK0153 NGVD 29 (??/??/92) 475.785 (m) 1560.97 (f) ADJ UNCH 2 0

FK0153

FK0153.Superseded values are not recommended for survey control.

FK0153.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0153.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0153

FK0153\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE009052(NAD 83)

FK0153\_MARKER: DB = BENCH MARK DISK

FK0153\_SETTING: 30 = SET IN A LIGHT STRUCTURE

FK0153\_SP\_SET: STEP

FK0153\_STAMPING: L 28 1934

FK0153\_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

FK0153

FK0153 HISTORY	- Date	Condition	Report By
FK0153 HISTORY	- 1934	MONUMENTED	CGS
FK0153 HISTORY	- 1937	GOOD	NGS

FK0153

FK0153 STATION DESCRIPTION

FK0153

FK0153'DESCRIBED BY NATIONAL GEODETIC SURVEY 1937

FK0153'AT CORDELL.

FK0153'AT CORDELL, 2 BLOCKS EAST OF THE ST. LOUIS-SAN FRANCISCO RAILWAY

FK0153'STATION, AT THE COURTHOUSE, AT THE WEST SIDE OF FOUR STEPS,

FK0153'AND IN THE TOP OF THE SOUTHWEST CORNER OF A CONCRETE STEP AT

FK0153'THE BASE OF A BRICK COLUMN. A STANDARD DISK, STAMPED L 28 1934.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0194 \*\*\*\*\*

**FK0194 DESIGNATION - W 2**

FK0194 PID - FK0194

FK0194 STATE/COUNTY- OK/CUSTER

FK0194 USGS QUAD - INDIANAPOLIS (1983)

FK0194

FK0194 \*CURRENT SURVEY CONTROL

FK0194

FK0194\* NAD 83(1993)- 35 32 41.75434(N) 098 50 05.72256(W) ADJUSTED

FK0194\* NAVD 88 - 511.664 (meters) 1678.68 (feet) ADJUSTED

FK0194

FK0194 X - -798,030.026 (meters) COMP

FK0194 Y - -5,134,259.019 (meters) COMP

FK0194 Z - 3,687,506.889 (meters) COMP

FK0194 LAPLACE CORR- 2.04 (seconds) DEFLECO9

FK0194 ELLIP HEIGHT- 484.274 (meters) (11/28/94) ADJUSTED

FK0194 GEOID HEIGHT- -27.10 (meters) GEOID09

FK0194 DYNAMIC HT - 511.155 (meters) 1677.01 (feet) COMP

FK0194 MODELED GRAV- 979,622.0 (mgal) NAVD 88

FK0194

FK0194 HORZ ORDER - SECOND

FK0194 VERT ORDER - FIRST CLASS II

FK0194 ELLP ORDER - FIFTH CLASS I

FK0194

FK0194.The horizontal coordinates were established by GPS observations

FK0194.and adjusted by the National Geodetic Survey in November 1994.

FK0194

FK0194.The orthometric height was determined by differential leveling and

FK0194.adjusted in June 1991.

FK0194

FK0194.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0194

FK0194.The Laplace correction was computed from DEFLECO9 derived deflections.

FK0194

FK0194.The ellipsoidal height was determined by GPS observations

FK0194.and is referenced to NAD 83.

FK0194

FK0194.The geoid height was determined by GEOID09.

FK0194

FK0194.The dynamic height is computed by dividing the NAVD 88

FK0194.geopotential number by the normal gravity value computed on the

FK0194.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0194.degrees latitude (g = 980.6199 gals.).

FK0194

FK0194.The modeled gravity was interpolated from observed gravity values.

FK0194

FK0194; North East Units Scale Factor Converg.

FK0194;SPC OK N - 60,787.548 524,290.788 MT 1.00000402 -0 29 33.8

FK0194;SPC OK N - 199,433.81 1,720,110.69 sFT 1.00000402 -0 29 33.8

FK0194;UTM 14 - 3,933,489.180 514,963.016 MT 0.99960276 +0 05 45.5

FK0194

FK0194! - Elev Factor x Scale Factor = Combined Factor  
 FK0194!SPC OK N - 0.99992400 x 1.00000402 = 0.99992802  
 FK0194!UTM 14 - 0.99992400 x 0.99960276 = 0.99952679

FK0194

FK0194 SUPERSEDED SURVEY CONTROL

FK0194

FK0194 NAD 83(1986)- 35 32 41.75985(N) 098 50 05.71031(W) AD( ) 2  
 FK0194 NGVD 29 (??/??/92) 511.458 (m) 1678.01 (f) ADJ UNCH 1 2

FK0194

FK0194.Superseded values are not recommended for survey control.

FK0194.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0194.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0194

FK0194\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE1496333489(NAD 83)

FK0194\_MARKER: DB = BENCH MARK DISK

FK0194\_SETTING: 17 = SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND

FK0194\_SP\_SET: METAL PIPE DRIVEN INTO GROUND

FK0194\_STAMPING: 1678.008

FK0194\_MARK LOGO: USGS

FK0194\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0194\_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

FK0194\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0194+SATELLITE: SATELLITE OBSERVATIONS - March 01, 1989

FK0194

FK0194 HISTORY - Date Condition Report By

FK0194 HISTORY - 1909 MONUMENTED USGS

FK0194 HISTORY - 1953 GOOD NGS

FK0194 HISTORY - 19890301 GOOD NGS

FK0194

FK0194 STATION DESCRIPTION

FK0194

FK0194'DESCRIBED BY NATIONAL GEODETIC SURVEY 1953

FK0194'8.1 MI W FROM WEATHERFORD.

FK0194'8.1 MILES WEST ALONG THE CHICAGO, ROCK ISLAND AND PACIFIC

FK0194'RAILROAD FROM THE STATION AT WEATHERFORD, 2 3/4 POLES SOUTHWEST

FK0194'OF MILEPOST 571, 60 FEET SOUTHWEST OF THE CENTER OF A GRAVELED

FK0194'ROAD CROSSING, 42 FEET SOUTH OF THE SOUTH RAIL, 30 FEET WEST

FK0194'OF THE CENTER LINE OF A GRAVELED ROAD, 6 FEET NORTH OF A FENCE

FK0194'CORNER, 9 FEET SOUTHWEST OF A CROSSING SIGN, 1.2 FEET SOUTH

FK0194'OF A WITNESS POST, SCREWED ON THE TOP OF A 3 1/2 INCH IRON

FK0194'PIPE WHICH PROJECTS 0.4 FOOT ABOVE THE GROUND.

FK0194

FK0194 STATION RECOVERY (1989)

FK0194

FK0194'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1989

FK0194'THE STATION WAS RECOVERED IN GOOD CONDITION, A NEW DESCRIPTION

FK0194'FOLLOWS.

FK0194'THE STATION IS LOCATED ABOUT 12.5 KM (7.75 MI) NORTHEAST OF CLINTON,

FK0194'11.3 KM (7.00 MI) WEST-NORTHWEST OF WEATHERFORD, AND 2.6 KM (1.60 MI)

FK0194'NORTH OF INTERSTATE HIGHWAY 40. OWNERSHIP--CUSTER COUNTY.

FK0194'TO REACH THE STATION FROM THE JUNCTION OF INTERSTATE HIGHWAY 40 AND

FK0194'U.S. HIGHWAY 183 IN SOUTH CLINTON, GO EASTERLY ON HIGHWAY 40 FOR 9.0

FK0194'KM (5.60 MI) TO EXIT 71. TAKE EXIT 71 AND GO NORTH ON CUSTER CITY

FK0194'ROAD FOR 0.9 KM (0.55 MI) TO A GRAVELED ROAD ON THE RIGHT. TURN RIGHT

FK0194'AND GO EAST ON THE GRAVELED ROAD FOR 3.2 KM (2.00 MI) TO A DIRT ROAD

FK0194 T-JUNCTION. TURN LEFT AND GO NORTH ON THE DIRT ROAD FOR 2.4 KM  
FK0194 (1.50 MI) TO THE STATION ON THE LEFT, JUST BEFORE CROSSING THE  
FK0194 FARMRAIL RAILROAD.

FK0194 THE STATION IS A STANDARD USGS DISK SET ON THE TOP OF A 9 CM PIPE THAT  
FK0194 PROJECTS 4 CM ABOVE THE GROUND. LOCATED 13.7 M (44.9 FT) SOUTH OF THE  
FK0194 NEAR RAIL, 9.2 M (30.2 FT) WEST OF THE CENTER OF THE ROAD, 3.0 M  
FK0194 (9.8 FT) SOUTHWEST OF A RAILROAD CROSSING SIGNPOST, 2.0 M (6.6 FT)  
FK0194 NORTHWEST OF A UTILITY POLE, AND 0.4 M (1.3 FT) EAST OF A METAL  
FK0194 WITNESS POST.

FK0194 DESCRIBED BY E.J. HANSMANN, TYPED BY RLZ.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0215 \*\*\*\*\*

FK0215 DESIGNATION - CLINTON

**FK0215 PID - FK0215**

FK0215 STATE/COUNTY- OK/CUSTER

FK0215 USGS QUAD - CLINTON (1983)

FK0215

FK0215 \*CURRENT SURVEY CONTROL

FK0215

FK0215\* NAD 83(1993)- 35 30 45.62738(N) 098 58 35.48894(W) ADJUSTED

FK0215\* NAVD 88 - 485.388 (meters) 1592.48 (feet) ADJUSTED

FK0215

FK0215 LAPLACE CORR- 2.25 (seconds) DEFLECO9

FK0215 GEOID HEIGHT- -27.26 (meters) GEOID09

FK0215 DYNAMIC HT - 484.902 (meters) 1590.88 (feet) COMP

FK0215 MODELED GRAV- 979,617.1 (mgal) NAVD 88

FK0215

FK0215 HORZ ORDER - FIRST

FK0215 VERT ORDER - FIRST CLASS II

FK0215

FK0215.The horizontal coordinates were established by classical geodetic methods

FK0215.and adjusted by the National Geodetic Survey in November 1994.

FK0215

FK0215.The orthometric height was determined by differential leveling and

FK0215.adjusted in June 1991.

FK0215

FK0215.The Laplace correction was computed from DEFLECO9 derived deflections.

FK0215

FK0215.The geoid height was determined by GEOID09.

FK0215

FK0215.The dynamic height is computed by dividing the NAVD 88

FK0215.geopotential number by the normal gravity value computed on the

FK0215.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FK0215.degrees latitude (g = 980.6199 gals.).

FK0215

FK0215.The modeled gravity was interpolated from observed gravity values.

FK0215

FK0215; North East Units Scale Factor Converg.

FK0215;SPC OK N - 57,328.511 511,415.014 MT 1.00001024 -0 34 34.7

FK0215;SPC OK N - 188,085.29 1,677,867.43 sFT 1.00001024 -0 34 34.7

FK0215;SPC OK S - 242,182.974 511,409.861 MT 1.00006715 -0 33 15.5

FK0215;SPC OK S - 794,561.97 1,677,850.52 sFT 1.00006715 -0 33 15.5

FK0215;UTM 14 - 3,929,899.356 502,128.713 MT 0.99960006 +0 00 49.1

FK0215

FK0215! - Elev Factor x Scale Factor = Combined Factor

FK0215!SPC OK N - 0.99992810 x 1.00001024 = 0.99993834

FK0215!SPC OK S - 0.99992810 x 1.00006715 = 0.99999524

FK0215!UTM 14 - 0.99992810 x 0.99960006 = 0.99952819

FK0215

FK0215: Primary Azimuth Mark Grid Az

FK0215:SPC OK N - ARAPAHOE TANK 007 32 29.5



FK0215:SPC OK S - ARAPAHOE TANK 007 31 10.3  
 FK0215:UTM 14 - ARAPAHOE TANK 006 57 05.7  
 FK0215  
 FK0215|-----|  
 FK0215|PID Reference Object Distance Geod. Az |  
 FK0215| dddmms.s |  
 FK0215|FK0556 ARAPAHOE TANK APPROX. 7.3 KM 0065754.8 |  
 FK0215|FK0557 ARAPAHOE CHRISTIAN SPIRE APPROX. 7.4 KM 0103035.5 |  
 FK0215|FK0555 ARAPAHOE PRESBYTERIAN CH SPIRE APPROX. 7.6 KM 0115719.1 |  
 FK0215|FK0558 CLINTON C B R AND H GROC TANK APPROX. 1.5 KM 0811158.7 |  
 FK0215|FK0214 CLINTON RM 1 30.770 METERS 08209 |  
 FK0215|FK0216 CLINTON RM 2 35.153 METERS 17952 |  
 FK0215|CK8366 CLINTON AZ MK 2653757.3 |  
 FK0215|FK0559 CLINTON MUN WATER TANK 22.889 METERS 32300 |  
 FK0215|-----|  
 FK0215  
 FK0215 SUPERSEDED SURVEY CONTROL  
 FK0215  
 FK0215 NAD 83(1986)- 35 30 45.63520(N) 098 58 35.47737(W) AD( ) 1  
 FK0215 NAD 27 - 35 30 45.45605(N) 098 58 34.16936(W) AD( ) 1  
 FK0215 NGVD 29 (??/??/92) 485.181 (m) 1591.80 (f) ADJ UNCH 1 2  
 FK0215  
 FK0215.Superseded values are not recommended for survey control.  
 FK0215.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.  
 FK0215.[See file dsdata.txt](#) to determine how the superseded data were derived.  
 FK0215  
 FK0215\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SNE0212829899(NAD 83)  
 FK0215\_MARKER: DS = TRIANGULATION STATION DISK  
 FK0215\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT  
 FK0215\_SP\_SET: SET IN TOP OF CONCRETE MONUMENT  
 FK0215\_STAMPING: CLINTON 1934  
 FK0215\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO  
 FK0215+STABILITY: SURFACE MOTION  
 FK0215\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
 FK0215+SATELLITE: SATELLITE OBSERVATIONS - August 03, 2005  
 FK0215  
 FK0215 HISTORY - Date Condition Report By  
 FK0215 HISTORY - 1935 MONUMENTED CGS  
 FK0215 HISTORY - 1953 GOOD CGS  
 FK0215 HISTORY - 1954 GOOD NGS  
 FK0215 HISTORY - 1955 GOOD CGS  
 FK0215 HISTORY - 20050803 GOOD GEOCAC  
 FK0215  
 FK0215 STATION DESCRIPTION  
 FK0215  
 FK0215'DESCRIBED BY COAST AND GEODETIC SURVEY 1935 (CIA)  
 FK0215'STATION IS LOCATED IN THE WEST EDGE OF THE CITY OF CLINTON,  
 FK0215'OKLAHOMA.  
 FK0215'  
 FK0215'REACHED FROM POST OFFICE BY GOING WEST ON FRISCO AVENUE  
 FK0215'0.4 MILE, TURN LEFT (SOUTH) ON THIRTEENTH STREET GO 0.1 MILE  
 FK0215'TO MUNICIPAL WATER TANK AND STATION ON LEFT.  
 FK0215'  
 FK0215'STATION MARK IS SET 146 FEET NORTH OF CENTERLINE OF HAYS  
 FK0215'AVENUE, 138 FEET WEST OF CENTERLINE OF THIRTEENTH STREET  
 FK0215'AND 74 FEET SOUTHEAST OF CENTER OF WATER TANK. MARK IS ABOUT

FK0215'2 INCHES BELOW THE SURFACE OF THE GROUND.

FK0215'

FK0215'REFERENCE MARK NO.1 IS 30.770 METERS (100.96 FEET) EAST OF FK0215'STATION AND 6 FEET WEST OF SIDE WALK, AND PROJECTS ABOUT 5 FK0215'INCHES ABOVE THE SURFACE OF THE GROUND.

FK0215'

FK0215'REFERENCE MARK NO.2 IS 34.728 METERS (113.94 FEET) SOUTH OF FK0215'STATION AND 6 FEET NORTH OF SIDEWALK, AND PROJECTS ABOUT FK0215'6 INCHES ABOVE THE SURFACE OF THE GROUND.

FK0215'

FK0215'AZIMUTH MARK IS APPROXIMATELY 0.3 MILE WEST OF STATION. FK0215'REACHED BY GOING WEST ON HAYS AVENUE 0.3 MILE TO MARK ON FK0215'RIGHT, 85 FEET NORTH-NORTHEAST OF NORTHEAST CORNER OF UNPAINTED FK0215'HOUSE, 39 FEET NORTH OF CENTERLINE OF HAYS AVENUE ON WEST FK0215'EDGE OF CULTIVATED FIELD, AND PROJECTS ABOUT 5 INCHES.

FK0215'

FK0215'HEIGHT OF LIGHT ABOVE STATION MARK - 23 METERS.

FK0215

FK0215

STATION RECOVERY (1953)

FK0215

FK0215'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1953 (MDR) FK0215'0.55 MILE WEST ALONG AVANT AVENUE FROM THE POST OFFICE AT FK0215'CLINTON, THENCE 0.05 MILE SOUTH ALONG SOUTH 13TH STREET, 138.7 FK0215'FEET WEST OF THE CENTER LINE OF SOUTH 13TH STREET, 56 FEET FK0215'SOUTHEAST OF THE SOUTH LEG OF THE CITY WATER TOWER, 7 FEET SOUTH FK0215'OF A SMALL EVERGREEN TREE, A TRIANGULATION STATION DISK FK0215'SET IN THE TOP OF A CONCRETE POST WHICH IS FLUSH WITH THE FK0215'GROUND, STAMPED CLINTON 1934.

FK0215'

FK0215'CLINTON R.M. NO. 1 IS 101.0 FEET NORTHEAST OF TRIANGULATION FK0215'STATION CLINTON 1934, 38.6 FEET WEST OF THE CENTER LINE OF SOUTH FK0215'13TH STREET, 5 FEET WEST OF THE WEST EDGE OF A CONCRETE FK0215'SIDEWALK, A REFERENCE MARK DISK SET IN THE TOP OF A CONCRETE FK0215'POST WHICH PROJECTS 0.2 FOOT ABOVE THE GROUND, STAMPED CLINTON FK0215'NO. 1 1934.

FK0215'

FK0215'CLINTON R.M. 2 IS 114.0 FEET SOUTH OF TRIANGULATION STATION FK0215'CLINTON 1934, 32.8 FEET NORTH OF THE CENTER LINE OF HAYS FK0215'AVENUE, 6 FEET NORTH OF THE NORTH EDGE OF A CONCRETE SIDEWALK, FK0215'14 FEET SOUTHEAST OF A 16 INCH ELM TREE, A REFERENCE MARK DISK FK0215'SET IN THE TOP OF A CONCRETE POST WHICH PROJECTS 0.2 FOOT FK0215'ABOVE THE GROUND, STAMPED CLINTON NO. 2 1934.

FK0215'

FK0215'CLINTON 1934 AZIMUTH WAS SEARCHED FOR BUT NOT RECOVERED. IT IS FK0215'BELIEVED TO HAVE BEEN DESTROYED BY HIGHWAY CONSTRUCTION.

FK0215

FK0215

STATION RECOVERY (1954)

FK0215

FK0215'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1954

FK0215'0.6 MI W FROM CLINTON.

FK0215'0.55 MILE WEST ALONG AVANT AVENUE FROM THE POST OFFICE AT FK0215'CLINTON, THENCE 0.05 MILE SOUTH ALONG SOUTH 13TH STREET, 138.7 FK0215'FEET WEST OF THE CENTER LINE OF SOUTH 13TH STREET, 56 FEET FK0215'SOUTHEAST OF THE SOUTH LEG OF THE CITY WATER TOWER, 7 FEET SOUTH FK0215'OF A SMALL EVERGREEN TREE, SET IN THE TOP OF A CONCRETE POST FK0215'WHICH IS FLUSH WITH THE GROUND.

FK0215

FK0215 STATION RECOVERY (1955)

FK0215

FK0215'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1955

FK0215'RECOVERED AS DESCRIBED ON LINE, EL RENO, OKLAHOMA TO JERICO,

FK0215'TEXAS. ON LITHOGRAPH SHEET DATED 4 MARCH 1954.

FK0215'

FK0215'CLINTON R. M. 1 WAS RECOVERED AS DESCRIBED ON LINE, EL RENO,

FK0215'OKLAHOMA TO JERICO, TEXAS. ON LITHOGRAPH SHEET DATED 4 MARCH

FK0215'1954.

FK0215'

FK0215'CLINTON R.M. 2 WAS RECOVERED AS DESCRIBED ON LINE, EL RENO.

FK0215'OKLAHOMA TO JERICO, TEXAS. ON LITHOGRAPH SHEET DATED 4 MARCH

FK0215'1954.

FK0215

FK0215 STATION RECOVERY (2005)

FK0215

FK0215'RECOVERY NOTE BY GEOCACHING 2005 (WD)

FK0215'THE STATION IS IN GOOD CONDITION, BUT THE DESCRIBED WATER TANK HAS

FK0215'BEEN REPLACED WITH A LARGE, METAL PICNIC SHELTER.

DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FJ0788 \*\*\*\*\*

**FJ0788 DESIGNATION - T 214**

FJ0788 PID - FJ0788

FJ0788 STATE/COUNTY- OK/GRADY

FJ0788 USGS QUAD - CHICKASHA (1975)

FJ0788

FJ0788 \*CURRENT SURVEY CONTROL

FJ0788

FJ0788\* NAD 83(1986)- 35 06 15. (N) 097 57 41. (W) SCALED

FJ0788\* NAVD 88 - 349.870 (meters) 1147.87 (feet) ADJUSTED

FJ0788

FJ0788 GEOID HEIGHT- -26.62 (meters) GEOID09

FJ0788 DYNAMIC HT - 349.524 (meters) 1146.73 (feet) COMP

FJ0788 MODELED GRAV- 979,632.8 (mgal) NAVD 88

FJ0788

FJ0788 VERT ORDER - FIRST CLASS II

FJ0788

FJ0788.The horizontal coordinates were scaled from a topographic map and have

FJ0788.an estimated accuracy of +/- 6 seconds.

FJ0788

FJ0788.The orthometric height was determined by differential leveling and

FJ0788.adjusted in June 1991.

FJ0788

FJ0788.The geoid height was determined by GEOID09.

FJ0788

FJ0788.The dynamic height is computed by dividing the NAVD 88

FJ0788.geopotential number by the normal gravity value computed on the

FJ0788.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FJ0788.degrees latitude (g = 980.6199 gals.).

FJ0788

FJ0788.The modeled gravity was interpolated from observed gravity values.

FJ0788

FJ0788; North East Units Estimated Accuracy

FJ0788;SPC OK S - 196,430. 603,520. MT (+/- 180 meters Scaled)

FJ0788

FJ0788 SUPERSEDED SURVEY CONTROL

FJ0788

FJ0788.No superseded survey control is available for this station.

FJ0788

FJ0788\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SND946850(NAD 83)

FJ0788\_MARKER: I = METAL ROD

FJ0788\_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

FJ0788\_SP\_SET: STAINLESS STEEL ROD

FJ0788\_STAMPING: T 214 1986

FJ0788\_MARK LOGO: NGS

FJ0788\_PROJECTION: FLUSH

FJ0788\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

FJ0788\_ROD/PIPE-DEPTH: 19.5 meters

FJ0788

FJ0788 HISTORY - Date Condition Report By

FJ0788 HISTORY - 1986 MONUMENTED NGS

FJ0788

FJ0788 STATION DESCRIPTION

FJ0788

FJ0788'DESCRIBED BY NATIONAL GEODETIC SURVEY 1986

FJ0788'7.7 KM (4.8 MI) NORTH FROM CHICKASHA.

FJ0788'7.7 KM (4.8 MI) NORTHERLY ALONG U.S. HIGHWAY 81 FROM THE FEDERAL  
FJ0788'BUILDING IN CHICKASHA, 15.1 M (49.5 FT) WEST OF THE CENTERLINE OF THE  
FJ0788'HIGHWAY, AND 4.7 M (15.4 FT) NORTH OF THE CENTER OF THE ENTRANCE INTO  
FJ0788'THE FAIR LAWN CEMETARY. NOTE--ACCESS TO DATUM POINT IS HAD THROUGH A  
FJ0788'5-INCH LOGO CAP.

FJ0788'THE MARK IS 0.1 METERS E FROM A WITNESS POST AND FENCE

FJ0788'THE MARK IS ABOVE LEVEL WITH THE HIGHWAY.

DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FJ0790 \*\*\*\*\*

**FJ0790 DESIGNATION - POCASSET AZ MK**

FJ0790 PID - FJ0790

FJ0790 STATE/COUNTY- OK/GRADY

FJ0790 USGS QUAD - POCASSET (1975)

FJ0790

FJ0790 \*CURRENT SURVEY CONTROL

FJ0790

FJ0790\* NAD 83(1986)- 35 07 58. (N) 097 57 40. (W) SCALED

FJ0790\* NAVD 88 - 359.180 (meters) 1178.41 (feet) ADJUSTED

FJ0790

FJ0790 GEOID HEIGHT- -26.69 (meters) GEOID09

FJ0790 DYNAMIC HT - 358.823 (meters) 1177.24 (feet) COMP

FJ0790 MODELED GRAV- 979,630.6 (mgal) NAVD 88

FJ0790

FJ0790 VERT ORDER - FIRST CLASS II

FJ0790

FJ0790.The horizontal coordinates were scaled from a topographic map and have

FJ0790.an estimated accuracy of +/- 6 seconds.

FJ0790

FJ0790.The orthometric height was determined by differential leveling and

FJ0790.adjusted in June 1991.

FJ0790

FJ0790.The geoid height was determined by GEOID09.

FJ0790

FJ0790.The dynamic height is computed by dividing the NAVD 88

FJ0790.geopotential number by the normal gravity value computed on the

FJ0790.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

FJ0790.degrees latitude (g = 980.6199 gals.).

FJ0790

FJ0790.The modeled gravity was interpolated from observed gravity values.

FJ0790

FJ0790; North East Units Estimated Accuracy

FJ0790;SPC OK S - 199,610. 603,540. MT (+/- 180 meters Scaled)

FJ0790

FJ0790 SUPERSEDED SURVEY CONTROL

FJ0790

FJ0790.No superseded survey control is available for this station.

FJ0790

FJ0790\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SND946882(NAD 83)

FJ0790\_MARKER: DZ = AZIMUTH MARK DISK

FJ0790\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

FJ0790\_SP\_SET: CONCRETE POST

FJ0790\_STAMPING: POCASSET 1957

FJ0790\_MARK LOGO: CGS

FJ0790\_PROJECTION: PROJECTING 5 CENTIMETERS

FJ0790\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

FJ0790+STABILITY: SURFACE MOTION

FJ0790

FJ0790 HISTORY - Date Condition Report By

FJ0790 HISTORY - 1957 MONUMENTED CGS

FJ0790 HISTORY - 1986 GOOD NGS

FJ0790

FJ0790 STATION DESCRIPTION

FJ0790

FJ0790 DESCRIBED BY NATIONAL GEODETIC SURVEY 1986

FJ0790 10.9 KM (6.8 MI) NORTH FROM CHICKASHA.

FJ0790 10.9 KM (6.75 MI) NORTHERLY ALONG U.S. HIGHWAY 81 FROM THE FEDERAL  
FJ0790 BUILDING IN CHICKASHA, 0.2 KM (0.1 MI) NORTH OF THE INTERSECTION OF A  
FJ0790 GRAVELED ROAD LEADING EAST, 15.3 M (50.2 FT) EAST OF THE CENTERLINE OF  
FJ0790 THE HIGHWAY, 7.7 M (25.3 FT) SOUTH OF A T-FENCE CORNER, AND 0.3 M  
FJ0790 (1.0 FT) WEST OF A FENCE.

FJ0790 THE MARK IS 1.0 METERS N FROM A WITNESS POST

FJ0790 THE MARK IS ABOVE LEVEL WITH THE HIGHWAY.

DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

AC9182 \*\*\*\*\*

**AC9182 DESIGNATION - PRCO A**

AC9182 PID - AC9182

AC9182 STATE/COUNTY- OK/MCCLAIN

AC9182 USGS QUAD - CRINER (1980)

AC9182

AC9182 \*CURRENT SURVEY CONTROL

AC9182

AC9182\* NAD 83(2007)- 34 58 55.95850(N) 097 31 17.65281(W) ADJUSTED

AC9182\* NAVD 88 - 344.213 (meters) 1129.31 (feet) ADJUSTED

AC9182

AC9182 EPOCH DATE - 2002.00

AC9182 X - -684,842.170 (meters) COMP

AC9182 Y - -5,186,802.806 (meters) COMP

AC9182 Z - 3,636,432.467 (meters) COMP

AC9182 LAPLACE CORR- 0.41 (seconds) DEFLEC09

AC9182 ELLIP HEIGHT- 318.099 (meters) (02/10/07) ADJUSTED

AC9182 GEOID HEIGHT- -26.11 (meters) GEOID09

AC9182 DYNAMIC HT - 343.875 (meters) 1128.20 (feet) COMP

AC9182

AC9182 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

AC9182 Type PID Designation North East Ellip

AC9182 -----

AC9182 NETWORK AC9182 PRCO A 0.61 0.45 1.80

AC9182 -----

AC9182 MODELED GRAV- 979,641.8 (mgal) NAVD 88

AC9182

AC9182 VERT ORDER - SECOND CLASS I

AC9182

AC9182.This is a reference station for the PURCELL

AC9182.National Continuously Operating Reference Station (PRCO).

AC9182

AC9182.The horizontal coordinates were established by GPS observations

AC9182.and adjusted by the National Geodetic Survey in February 2007.

AC9182

AC9182.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AC9182.See [National Readjustment](#) for more information.

AC9182.The horizontal coordinates are valid at the epoch date displayed above.

AC9182.The epoch date for horizontal control is a decimal equivalence

AC9182.of Year/Month/Day.

AC9182

AC9182.The orthometric height was determined by differential leveling and

AC9182.adjusted in July 2002.

AC9182

AC9182.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AC9182

AC9182.The Laplace correction was computed from DEFLEC09 derived deflections.

AC9182

AC9182.The ellipsoidal height was determined by GPS observations

AC9182.and is referenced to NAD 83.



AC9182

AC9182.The geoid height was determined by GEOID09.

AC9182

AC9182.The dynamic height is computed by dividing the NAVD 88

AC9182.geopotential number by the normal gravity value computed on the

AC9182.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

AC9182.degrees latitude (g = 980.6199 gals.).

AC9182

AC9182.The modeled gravity was interpolated from observed gravity values.

AC9182

AC9182;	North	East	Units	Scale Factor	Converg.
AC9182;SPC OK S	- 183,005.252	643,682.518	MT	0.99996000	+0 16 17.6
AC9182;SPC OK S	- 600,409.73	2,111,815.06	sFT	0.99996000	+0 16 17.6
AC9182;UTM 14	- 3,872,068.589	634,943.529	MT	0.99982443	+0 50 51.9

AC9182

AC9182! - Elev Factor x Scale Factor = Combined Factor

AC9182!SPC OK S - 0.99995007 x 0.99996000 = 0.99991007

AC9182!UTM 14 - 0.99995007 x 0.99982443 = 0.99977451

AC9182

AC9182	PID	Reference Object	Distance	Geod. Az
AC9182			ddmmss.s	
AC9182	AB6374	PURCELL CORS L1 PHASE CENTER	336.565 METERS	14048

AC9182

AC9182 SUPERSEDED SURVEY CONTROL

AC9182

AC9182 ELLIP H (02/05/01) 318.100 (m) GP( ) 2 2

AC9182 NAD 83(1993)- 34 58 55.95840(N) 097 31 17.65327(W) AD( ) B

AC9182 ELLIP H (10/23/97) 318.113 (m) GP( ) 4 2

AC9182

AC9182.Superseded values are not recommended for survey control.

AC9182.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AC9182.[See file dsdata.txt](#) to determine how the superseded data were derived.

AC9182

AC9182\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SPD3494372068(NAD 83)

AC9182\_MARKER: I = METAL ROD

AC9182\_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL

AC9182+WITH SETTING: INFORMATION.

AC9182\_STAMPING: PRCO A 1997

AC9182\_MARK LOGO: NGS

AC9182\_PROJECTION: FLUSH

AC9182\_MAGNETIC: I = MARKER IS A STEEL ROD

AC9182\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

AC9182\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AC9182+SATELLITE: SATELLITE OBSERVATIONS - May 09, 1997

AC9182\_ROD/PIPE-DEPTH: 1.3 meters

AC9182

AC9182 HISTORY - Date Condition Report By

AC9182 HISTORY - 1997 MONUMENTED NGS

AC9182 HISTORY - 19970509 GOOD NGS

AC9182

AC9182 STATION DESCRIPTION

AC9182

AC9182'DESCRIBED BY NATIONAL GEODETIC SURVEY 1997 (GAS)

AC9182'14.4 KM (8.95 MI) WESTERLY ALONG STATE HIGHWAY 39 FROM THE JUNCTION OF

AC9182'INTERSTATE HIGHWAY 35 IN PURCELL, THENCE 3.5 KM (2.15 MI) SOUTHERLY  
AC9182'ALONG A GRAVELED ROAD, THENCE 0.5 KM (0.30 MI) SOUTHERLY ALONG A  
AC9182'DRIVEWAY, 58.9 M (193.2 FT) EAST OF THE DRIVEWAY CENTER, 15.2 M (49.9  
AC9182'FT) WEST OF A UTILITY POLE 2.9 M (9.5 FT) SOUTH OF A T-FENCE CORNER,  
AC9182'1.0 M (3.3 FT) ABOVE THE LEVEL OF THE DRIVEWAY, AND 0.5 M (1.6 FT)  
AC9182'WEST OF A WITNESS POST AND FENCE. NOTE--ACCESS TO THE DATUM POINT IS  
AC9182'THROUGH A 5-INCH LOGO CAP. THE SLEEVE DEPTH OF 0.9 METER DOES NOT  
AC9182'MEET THE SPECIFICATIONS FOR A CLASS A MARK. THE ROD WAS DRIVEN TO  
AC9182'REFUSAL AND ANCHORED.

AC9182

STATION RECOVERY (1997)

AC9182

AC9182

AC9182'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1997 (ALG)

AC9182'STATION WAS RECOVERED USING THE ORIGINAL DESCRIPTION.

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DRAFT

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = ,PROGRAM = datasheet, VERSION = 7.85

1 National Geodetic Survey, Retrieval Date = JULY 9, 2010

FK0641 \*\*\*\*\*

FK0641 CBN - This is a Cooperative Base Network Control Station.

**FK0641 DESIGNATION - FORTY ONE**

FK0641 PID - FK0641

FK0641 STATE/COUNTY- OK/WASHITA

FK0641 USGS QUAD - ELK CITY SE (1987)

FK0641

FK0641 \*CURRENT SURVEY CONTROL

FK0641

FK0641\* NAD 83(2007)- 35 17 28.50464(N) 099 16 59.35575(W) ADJUSTED

FK0641\* NAVD 88 - 546.5 (meters) 1793. (feet) GPS OBS

FK0641

FK0641 EPOCH DATE - 2002.00

FK0641 X - -840,807.179 (meters) COMP

FK0641 Y - -5,143,986.245 (meters) COMP

FK0641 Z - 3,664,588.591 (meters) COMP

FK0641 LAPLACE CORR- 0.35 (seconds) DEFLEC09

FK0641 ELLIP HEIGHT- 519.554 (meters) (02/10/07) ADJUSTED

FK0641 GEOID HEIGHT- -26.95 (meters) GEOID09

FK0641

FK0641 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

FK0641 Type PID Designation North East Ellip

FK0641 -----

FK0641 NETWORK FK0641 FORTY ONE 1.27 1.12 2.92

FK0641 -----

FK0641

FK0641.The horizontal coordinates were established by GPS observations

FK0641.and adjusted by the National Geodetic Survey in February 2007.

FK0641

FK0641.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

FK0641.See [National Readjustment](#) for more information.

FK0641.The horizontal coordinates are valid at the epoch date displayed above.

FK0641.The epoch date for horizontal control is a decimal equivalence

FK0641.of Year/Month/Day.

FK0641

FK0641.The orthometric height was determined by GPS observations and a

FK0641.high-resolution geoid model.

FK0641

FK0641.The X, Y, and Z were computed from the position and the ellipsoidal ht.

FK0641

FK0641.The Laplace correction was computed from DEFLEC09 derived deflections.

FK0641

FK0641.The ellipsoidal height was determined by GPS observations

FK0641.and is referenced to NAD 83.

FK0641

FK0641.The geoid height was determined by GEOID09.

FK0641

FK0641; North East Units Scale Factor Converg.

FK0641;SPC OK S - 217,928.951 483,281.503 MT 1.00001196 -0 43 42.0

FK0641;SPC OK S - 714,988.57 1,585,566.06 sFT 1.00001196 -0 43 42.0

FK0641;UTM 14 - 3,905,379.258 474,253.548 MT 0.99960817 -0 09 48.9

FK0641

FK0641! - Elev Factor x Scale Factor = Combined Factor

FK0641!SPC OK S - 0.99991846 x 1.00001196 = 0.99993042

FK0641!UTM 14 - 0.99991846 x 0.99960817 = 0.99952666

FK0641

FK0641 SUPERSEDED SURVEY CONTROL

FK0641

FK0641 ELLIP H (04/16/01) 519.556 (m) GP( ) 4 2

FK0641 NAD 83(1993)- 35 17 28.50459(N) 099 16 59.35532(W) AD( ) B

FK0641 ELLIP H (05/09/94) 519.589 (m) GP( ) 4 2

FK0641

FK0641.Superseded values are not recommended for survey control.

FK0641.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

FK0641.[See file dsdata.txt](#) to determine how the superseded data were derived.

FK0641

FK0641\_U.S. NATIONAL GRID SPATIAL ADDRESS: 14SME7425305379(NAD 83)

FK0641\_MARKER: I = METAL ROD

FK0641\_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

FK0641\_SP\_SET: STAINLESS STEEL ROD IN SLEEVE

FK0641\_STAMPING: FORTY ONE 1993

FK0641\_MARK LOGO: NGS

FK0641\_PROJECTION: RECESSED 1 CENTIMETERS

FK0641\_MAGNETIC: N = NO MAGNETIC MATERIAL

FK0641\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

FK0641\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

FK0641+SATELLITE: SATELLITE OBSERVATIONS - May 09, 2007

FK0641\_ROD/PIPE-DEPTH: 2.13 meters

FK0641\_SLEEVE-DEPTH : 0.9 meters

FK0641

FK0641 HISTORY - Date Condition Report By

FK0641 HISTORY - 1993 MONUMENTED NGS

FK0641 HISTORY - 20070509 GOOD INDIV

FK0641

FK0641 STATION DESCRIPTION

FK0641

FK0641'DESCRIBED BY NATIONAL GEODETIC SURVEY 1993

FK0641'STATION IS LOCATED ABOUT 18 KM (11.20 MI) SOUTHEAST OF ELK CITY, 14 KM

FK0641'(8.70 MI) WEST OF DILL CITY, 0.13 KM (0.10 MI) EAST OF A VACANT GAS

FK0641'STATION AND STORE, ALONG STATE HIGHWAY 152, ON THE RIGHT-OF-WAY, AT A

FK0641'FIELD ROAD LEADING SOUTH THROUGH PASTURE, ON THE TOP OF A RISE, IN

FK0641'THE NORTHEAST 1/4 OF SECTION 2, T 10 N, R 20 W. OWNERSHIP--OKLAHOMA

FK0641'DEPARTMENT OF TRANSPORTATION.

FK0641'TO REACH FROM THE UNDERPASS AT THE JUNCTION OF INTERSTATE HIGHWAY 40

FK0641'AND STATE HIGHWAY 6 (EXIT 38) AT ELK CITY, GO SOUTH ON HIGHWAY 6 FOR

FK0641'11.05 KM (6.85 MI) TO ITS INTERSECTION WITH STATE HIGHWAY 152. TURN

FK0641'LEFT, EAST, ON HIGHWAY 152 FOR 8.54 KM (5.30 MI) TO THE ELK CREEK

FK0641'PRIMITIVE BAPTIST CHURCH ON THE LEFT. CONTINUE AHEAD, EAST, ON

FK0641'HIGHWAY 152 FOR 2.16 KM (1.35 MI) TO TOP OF RISE AND STATION ON THE

FK0641'RIGHT JUST PAST A FIELD ENTRANCE ON THE RIGHT.

FK0641'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STAINLESS STEEL ROD IN A

FK0641'2.5 CM GREASE FILLED SLEEVE 90 CM LONG ENCASED IN A 12.7 CM PVC PIPE

FK0641'WITH LOGO CAP SURROUNDED BY CONCRETE SET 1 CM BELOW GROUND. IT IS

FK0641'43.7 M (143.4 FT) EAST FROM THE EAST GATE POST AT FIELD ROAD, 17.6 M

FK0641'(57.7 FT) SOUTH FROM, AND LEVEL WITH THE HIGHWAY CENTER, 0.6 M

FK0641'(2.0 FT) NORTH FROM A FIBERGLASS WITNESS POST IN THE RIGHT-OF-WAY

FK0641 FENCE, 1.1 M (3.6 FT) SOUTHEAST OF A STEEL WITNESS POST, AND 1.1 M  
FK0641 (3.6 FT) SOUTHWEST OF A STEEL WITNESS POST.

FK0641

FK0641 STATION RECOVERY (2007)

FK0641

FK0641 RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2007 (DJK)

FK0641 DESCRIPTION IS ADEQUATE.

---

DRAFT

DRAFT

**Base Control Set by AMEC**

## **BASE CONTROL SET BY AMEC**

### **Point Name: 1000**

Latitude: **35°36'39.45677"N**

Longitude: **99°46'22.02086"W**

Ellipsoid Height: **649.455m**

UTM Zone 14N Northing = **3941074.500m**

UTM Zone 14N Easting = **430009.690m**

Elevation: **677.210m**

Material set: **REBAR**

Initial base use: **11/10/2009 14:18**

Set from: **57 WHV**

Date of initial observation: **11/09/2009 12:02**

Stability: **Unknown**

**DRAFT**

## **BASE CONTROL SET BY AMEC**

### **Point Name: 1006**

Latitude: **34°54'49.03845"N**

Longitude: **98°48'49.43599"W**

Ellipsoid Height: **435.581m**

UTM Zone 14N Northing = **3863479.947m**

UTM Zone 14N Easting = **517015.096m**

Elevation: **461.127m**

Material set: **REBAR**

Initial base use: **11/21/2009 09:41**

Set from: **21 K 35**

Date of initial observation: **11/20/2009 14:50**

Stability: **Unknown**

**DRAFT**



## **BASE CONTROL SET BY AMEC**

**Point Name: 1007**

Latitude: **35°06'53.80963"N**

Longitude: **98°26'29.49144"W**

Ellipsoid Height: **379.140m**

UTM Zone 14N Northing = **3885933.053m**

UTM Zone 14N Easting = **550890.637m**

Elevation: **405.956m**

Material set: **REBAR**

Initial base use: **12/02/2009 07:38**

Set from: **2014**

Date of initial observation: **11/23/2009 11:13**

Stability: **Unknown**

**DRAFT**

## **BASE CONTROL SET BY AMEC**

Point Name: **1008**

Latitude: **34°41'57.41517"N**

Longitude: **97°57'28.46732"W**

Ellipsoid Height: **384.134m**

UTM Zone 14N Northing = **3840189.530m**

UTM Zone 14N Easting = **595441.107m**

Elevation: **410.210m**

Material set: **REBAR**

Initial base use: **12/07/2009 13:44**

Set from: **BETHEL**

Date of initial observation: **12/07/2009 12:38**

Stability: **Unknown**

**DRAFT**

## **BASE CONTROL SET BY AMEC**

Point Name: **1009**

Latitude: **34°46'48.90439"N**

Longitude: **97°24'20.53649"W**

Ellipsoid Height: **293.700m**

UTM Zone 14N Northing = **3849832.101m**

UTM Zone 14N Easting = **645876.590m**

Elevation: **319.394m**

Material set: **REBAR**

Initial base use: **12/10/2009 07:51**

Set from: **PRCO B**

Date of initial observation: **12/09/2009 09:05**

Stability: **Unknown**

**DRAFT**

## **BASE CONTROL SET BY AMEC**

Point Name: **1010**

Latitude: **34°47'47.11546"N**

Longitude: **97°03'37.18739"W**

Ellipsoid Height: **304.754m**

UTM Zone 14N Northing = **3852181.741m**

UTM Zone 14N Easting = **677447.286m**

Elevation: **330.462m**

Material set: **REBAR**

Initial base use: **12/12/2009 09:27**

Set from: **MAXWELL**

Date of initial observation: **12/10/2009 9:50**

Stability: **Unknown**

**DRAFT**

## **BASE CONTROL SET BY AMEC**

Point Name: **1011**

Latitude: **34°26'55.21643"N**

Longitude: **97°33'40.74228"W**

Ellipsoid Height: **296.429m**

UTM Zone 14N Northing = **3812844.290m**

UTM Zone 14N Easting = **632161.680m**

Elevation: **322.121m**

Material set: **REBAR**

Initial base use: **12/15/2009 08:38**

Set from: **FUQUA**

Date of initial observation: **12/11/2009 12:09**

Stability: **Unknown**

**DRAFT**

## **BASE CONTROL SET BY AMEC**

Point Name: **1012**

Latitude: **34°20'53.04077"N**

Longitude: **97°23'13.49156"W**

Ellipsoid Height: **263.241m**

UTM Zone 14N Northing = **3801928.331m**

UTM Zone 14N Easting = **648346.484m**

Elevation: **288.964m**

Material set: **REBAR**

Initial base use: **12/18/2009 08:07**

Set from: **1011**

Date of initial observation: **12/15/2009 11:10**

Stability: **Unknown**

DRAFT

## **BASE CONTROL SET BY AMEC**

Point Name: **1013**

Latitude: **34°30'21.14734"N**

Longitude: **96°52'46.95820"W**

Ellipsoid Height: **350.713m**

UTM Zone 14N Northing = **3820289.482m**

UTM Zone 14N Easting = **694651.838m**

Elevation: **376.066m**

Material set: **REBAR**

Initial base use: **12/17/2009 08:17**

Set from: **JOY**

Date of initial observation: **12/16/2009 12:35**

Stability: **Unknown**

DRAFT

## **BASE CONTROL SET BY AMEC**

Point Name: **1014**

Latitude: **34°21'39.92609"N**

Longitude: **96°45'15.93882"W**

Ellipsoid Height: **277.068m**

UTM Zone 14N Northing = **3804478.939m**

UTM Zone 14N Easting = **706511.520m**

Elevation: **302.578m**

Material set: **REBAR**

Initial base use: **12/22/2009 08:35**

Set from: **1013**

Date of initial observation: **12/17/2009 11:55**

Stability: **Unknown**

**DRAFT**



## **BASE CONTROL SET BY AMEC**

Point Name: **1015**

Latitude: **34°18'11.67516"N**

Longitude: **97°05'56.94511"W**

Ellipsoid Height: **255.189m**

UTM Zone 14N Northing = **3797415.457m**

UTM Zone 14N Easting = **674924.820m**

Elevation: **280.841m**

Material set: **REBAR**

Initial base use: **12/19/2009 13:43**

Set from: **A 81**

Date of initial observation: **12/19/2009 13:10**

Stability: **Unknown**

DRAFT

## **BASE CONTROL SET BY AMEC**

Point Name: **1016**

Latitude: **34°06'51.50279"N**

Longitude: **96°37'36.95308"W**

Ellipsoid Height: **203.782m**

UTM Zone 14N Northing = **3777373.177m**

UTM Zone 14N Easting = **718877.163m**

Elevation: **229.877m**

Material set: **REBAR**

Initial base use: **12/23/2009 10:07**

Set from: **MANN**

Date of initial observation: **12/23/2009 08:54**

Stability: **Unknown**

DRAFT

## **BASE CONTROL SET BY AMEC**

Point Name: **1018**

Latitude: **34°06'48.09075"N**

Longitude: **96°09'10.14779"W**

Ellipsoid Height: **184.376m**

UTM Zone 14N Northing = **3778386.401m**

UTM Zone 14N Easting = **762621.639m**

Elevation: **211.613m**

Material set: **REBAR**

Initial base use: **01/15/2010 08:09**

Set from: **T 212**

Date of initial observation: **01/13/2010 14:43**

Stability: **Unknown**

DRAFT

## **BASE CONTROL SET BY AMEC**

Point Name: **1019**

Latitude: **34°17'06.86227"N**

Longitude: **96°11'53.49131"W**

Ellipsoid Height: **157.509m**

UTM Zone 14N Northing = **3797337.459m**

UTM Zone 14N Easting = **757910.704m**

Elevation: **185.009m**

Material set: **REBAR**

Initial base use: **01/18/2010 08:30**

Set from: **HOPEWELL**

Date of initial observation: **01/14/2010 09:49**

Stability: **Unknown**

**DRAFT**

## **BASE CONTROL SET BY AMEC**

Point Name: **1020**

Latitude: **34°21'08.40748"N**

Longitude: **96°32'55.36576"W**

Ellipsoid Height: **241.778m**

UTM Zone 14N Northing = **3803945.796m**

UTM Zone 14N Easting = **725457.348m**

Elevation: **267.768m**

Material set: **REBAR**

Initial base use: **01/19/2010 09:47**

Set from: **HOPEWELL**

Date of initial observation: **01/14/2010 11:47**

Checked to: **JESSE, HOPEWELL**

Stability: **Unknown**

**DRAFT**

## **BASE CONTROL SET BY AMEC**

Point Name: **1021**

Latitude: **34°45'09.83823"N**

Longitude: **96°25'26.29513"W**

Ellipsoid Height: **228.395m**

UTM Zone 14N Northing = **3848645.492m**

UTM Zone 14N Easting = **735799.901m**

Elevation: **255.535m**

Material set: **REBAR**

Initial base use: **01/27/2010 12:01**

Set from: **JESSE**

Date of initial observation: **01/27/2010 10:30**

Stability: **Unknown**

DRAFT

## **BASE CONTROL SET BY AMEC**

Point Name: **2014**

Latitude: **35°08'47.33887"N**

Longitude: **98°43'47.30660"W**

Ellipsoid Height: **416.563m**

UTM Zone 14N Northing = **3889321.078m**

UTM Zone 14N Easting = **524611.534m**

Elevation: **443.091m**

Material set: **REBAR**

Initial base use: **11/23/2009 07:59**

Set from: **COWDEN**

Date of initial observation: **11/19/2009 14:41**

Stability: **Unknown**

DRAFT

**DRAFT**

**APPENDIX B**

**LiDAR System and Flight Report**



# NRCS Oklahoma Dam Rehab

## LiDAR System and Flight Report

Prepared by:



Merrick & Company  
2450 South Peoria Street  
Aurora, CO 80014  
Phone: (303) 751-0741  
Fax: (303) 745-0964  
[www.merrick.com](http://www.merrick.com)

Merrick & Company Job Number 02016426

# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## **EXECUTIVE SUMMARY**

Merrick & Company (Merrick) was contracted by AMEC/NRCS to perform a LiDAR (**L**ight **D**etection **A**nd **R**anging) survey covering a significant area located in the State of Oklahoma. One major site consisting of 9,209 square miles and 4 smaller sites comprising approximately 161 square miles for a total area of 9370 square miles. The purpose of the project is to produce accurate high-resolution data for use in planning, design, and research, utilizing LiDAR. Horizontal accuracy meets or exceeds standards for both vertical and horizontal accuracy as stated in NDEP Guidelines for Digital Elevation Data, Version 1.0 for NSSDA of 95% confidence for 2-ft contours and ASPRS Class I Standards.

## **CONTRACT INFORMATION**

Questions regarding this report should be addressed to:

**Brian Holzworth**  
**Project Manager**  
**Merrick & Company**  
**GeoSpatial Solutions**  
2450 South Peoria Street  
Aurora, CO 80014-5472  
303-353-3952  
303-745-0964 Fax  
800-544-1714, x-3952  
[brian.holzworth@merrick.com](mailto:brian.holzworth@merrick.com)  
[www.merrick.com](http://www.merrick.com)

# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## Project Completion

The contents of this report summarize the methods used to establish the GPS base station network, perform the LiDAR data collection and post-processing as well as the results of these methods for the NRCS Oklahoma Dam Rehab project.

## LiDAR FLIGHT and SYSTEM REPORT

### **Project Location**

The project location is defined by the shapefile, Boundaries\_Merged\_with\_Add\_on\_areaUTM.shp.

### **Duration/Time Period**

One LiDAR aircraft, a Cessna 402C (SN53), was used to collect LiDAR Data. The Cessna 402C (SN53) arrived on site December 1, 2009 and the LiDAR data collection was accomplished December 4, 2009 thru March 26, 2010. There was snow on the ground thru most of the month of January. The airports of operation were the Elk City Airport (KELK), the Hobart Municipal Airport (HBR), the Chickasha Municipal Airport (CHI), the Ardmore Municipal Airport (ADM0), and the Stillwater Municipal (KSWO).

### **Mission Parameters for Area Lower Black Bear, Flown at Flight Altitude of 3810 Meters**

<b>LiDAR Sensor</b>	Leica Geosystems ALS50 Phase 2+
<b>Nominal Ground Sample Distance</b>	1.40 meters
<b>Field of View (scan angle)</b>	30 deg.
<b>Average Groundspeed</b>	141 Knots
<b>Laser Pulse Rate</b>	71,000 Hertz
<b>Scan Rate</b>	23.8 Hz
<b>Average Altitude</b>	3,810 meters MSL

### **Mission Parameters for Area Quapaw Creek, Flown at Flight Altitude of 3810 Meters**

<b>LiDAR Sensor</b>	Leica Geosystems ALS50 Phase 2+
<b>Nominal Ground Sample Distance</b>	1.40 meters
<b>Field of View (scan angle)</b>	30 deg.
<b>Average Groundspeed</b>	141 Knots
<b>Laser Pulse Rate</b>	71,000 Hertz
<b>Scan Rate</b>	24.1 Hz
<b>Average Altitude</b>	3,810 meters MSL

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

**Mission Parameters for Area Rock Creek Flown at Altitude 3810 Meters**

<b>LiDAR Sensor</b>	Leica Geosystems ALS50 Phase 2+
<b>Nominal Ground Sample Distance</b>	1.40 meters
<b>Field of View (scan angle)</b>	30 deg.
<b>Average Groundspeed</b>	138 Knots
<b>Laser Pulse Rate</b>	70,200 Hertz
<b>Scan Rate</b>	23.5 Hz
<b>Average Altitude</b>	3,810 meters MSL

**Mission Parameters for Area Sallisaw Creek Flown at Altitude 3810 Meters**

<b>LiDAR Sensor</b>	Leica Geosystems ALS50 Phase 2+
<b>Nominal Ground Sample Distance</b>	1.40 meters
<b>Field of View (scan angle)</b>	30 deg.
<b>Average Groundspeed</b>	134 Knots
<b>Laser Pulse Rate</b>	69,400
<b>Scan Rate</b>	22.9 Hz
<b>Average Altitude</b>	3,810 meters MSL

**Mission Parameters for Area Main High Zone Flown at Altitude 3810 Meters**

<b>LiDAR Sensor</b>	Leica Geosystems ALS50 Phase 2+
<b>Nominal Ground Sample Distance</b>	1.40 meters
<b>Field of View (scan angle)</b>	35 deg.
<b>Average Groundspeed</b>	144 Knots
<b>Laser Pulse Rate</b>	76,600 Hertz
<b>Scan Rate</b>	24.6 Hz
<b>Average Altitude</b>	3,810 meters MSL

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

**Mission Parameters for Area Main Low Zone Flown at Altitude 3505 Meters**

<b>LiDAR Sensor</b>	Leica Geosystems ALS50 Phase 2+
<b>Nominal Ground Sample Distance</b>	1.40 meters
<b>Field of View (scan angle)</b>	33 deg.
<b>Average Groundspeed</b>	145 Knots
<b>Laser Pulse Rate</b>	75,200 Hertz
<b>Scan Rate</b>	24.8 Hz
<b>Average Altitude</b>	3,505 meters MSL

**Mission Parameters for Area Main Medium Zone Flown at Altitude 3658 Meters**

<b>LiDAR Sensor</b>	Leica Geosystems ALS50 Phase 2+
<b>Nominal Ground Sample Distance</b>	1.40 meters
<b>Field of View (scan angle)</b>	34 deg.
<b>Average Groundspeed</b>	145 Knots
<b>Laser Pulse Rate</b>	76,200 Hertz
<b>Scan Rate</b>	24.7 Hz
<b>Average Altitude</b>	3,658 meters MSL

**Mission Parameters for Add on Area Flown at Altitude 3505 Meters**

<b>LiDAR Sensor</b>	Leica Geosystems ALS50 Phase 2+
<b>Nominal Ground Sample Distance</b>	1.40 meters
<b>Field of View (scan angle)</b>	30 deg.
<b>Average Groundspeed</b>	159 Knots
<b>Laser Pulse Rate</b>	74,800 Hertz
<b>Scan Rate</b>	27.0 Hz
<b>Average Altitude</b>	3,505 meters MSL

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

**Flight mission Date and Times**

<b>Mission</b>	<b>Date</b>	<b>Plane S/N</b>	<b>Start Time GPS sec.</b>	<b>End Time GPS sec. WR=Week Rollover (604800sec.)</b>	<b>Length Time Hours</b>	<b>Number of GNSS Solution Records</b>
091204_A	Dec. 04, 2009	SN53	481711.5	499579.5	5.0 Hrs.	35736
091204_B	Dec. 04, 2009	SN53	503559.5	514173.5	2.9 Hrs.	21228
091204_C	Dec. 04, 2009	SN53	517174.5	527356.5	2.8 Hrs.	20364
091205_A	Dec. 05, 2009	SN53	578863.5	596628.5	4.9 Hrs.	35530
091205_B	Dec. 05, 2009	SN53	599121.0	10878.0	4.6 Hrs.	33114
091206_A	Dec. 06, 2009	SN53	72425.0	80699.0	2.3 Hrs.	16548
091210_A	Dec. 10, 2009	SN53	403879.5	422766.5	5.2 Hrs.	37774
091210_B	Dec. 10, 2009	SN53	427614.5	445028.5	4.8 Hrs.	34828
091212_A	Dec. 12, 2009	SN53	601819.5	9592.0 WR	3.5 Hrs.	25145
091213_A	Dec. 13, 2009	SN53	55910.0	70491.5	4.1 Hrs.	29163
091213_B	Dec. 13, 2009	SN53	74015.0	86856.0	3.6 Hrs.	25682
091213_C	Dec. 13, 2009	SN53	88445.5	108593.5	5.6 Hrs.	40296
091214_A	Dec. 14, 2009	SN53	179652.5	196743.5	4.7 Hrs.	34182
091215_A	Dec. 15, 2009	SN53	225707.0	242741.0	4.7 Hrs.	34068
091216_A	Dec. 16, 2009	SN53	358062.5	369931.5	3.3 Hrs.	23738
091217_A	Dec. 17, 2009	SN53	397195.0	414358.0	4.8 Hrs.	34326
091217_B	Dec. 17, 2009	SN53	421223.5	428504.5	2.0 Hrs.	14562
091218_A	Dec. 18, 2009	SN53	507774.5	521030.0	3.7 Hrs.	26511
091218_B	Dec. 18, 2009	SN53	523446.5	537926.0	4.0 Hrs.	28959
091219_A	Dec. 19, 2009	SN53	596193.5	8113.5	4.6 Hrs.	33440
091220_A	Dec. 20, 2009	SN53	58646.0	70260.0	3.2 Hrs.	23228
091220_B	Dec. 20, 2009	SN53	72758.5	90132.5	4.8 Hrs.	34748
100121_A	Jan. 21, 2010	SN53	413964.5	432329.0	5.1 Hrs.	36729
100121_B	Jan. 21, 2010	SN53	433884.5	453433.0	5.4 Hrs.	39097
100122_A	Jan. 22, 2010	SN53	488190.5	506992.0	5.2 Hrs.	37603
100122_B	Jan. 22, 2010	SN53	509094.0	525439.0	4.5 Hrs.	32690

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

<b>100124_A</b>	Jan. 24, 2010	SN53	76948.0	93883.0	4.7 Hrs.	33870
<b>100125_A</b>	Jan. 25, 2010	SN53	141399.5	151232.5	2.7 Hrs.	19666
<b>100125_B</b>	Jan. 25, 2010	SN53	155970.5	172767.0	4.7 Hrs.	33593
<b>100126_A</b>	Jan. 26, 2010	SN53	243340.5	262609.5	5.4 Hrs.	38538
<b>100126_B</b>	Jan. 26, 2010	SN53	264034.5	269177.5	1.4 Hrs.	10286
<b>100126_B2</b>	Jan. 26, 2010	SN53	269198.0	282957.0	3.8 Hrs.	27518
<b>100205_A</b>	Feb. 05, 2010	SN53	518063.5	532009.0	3.9 Hrs.	27891
<b>100209_A</b>	Feb. 09, 2010	SN53	223733.0	237614.0	3.9 Hrs.	27762
<b>100209_B</b>	Feb. 09, 2010	SN53	240207.0	254705.5	4.0 Hrs.	28997
<b>100318_A</b>	March 18,2010	SN53	400128.0	411809.5	3.2 Hrs.	23363
<b>100318_B</b>	March 18,2010	SN53	412288.5	418470.0	1.7 Hrs.	12363
<b>100318_C</b>	March 18,2010	SN53	425074.5	444190.5	5.3 Hrs.	38232
<b>100322_A</b>	March 22,2010	SN53	136294.0	156692.5	5.6 Hrs.	40797
<b>100322_B</b>	March 22,2010	SN53	158250.5	179807.0	6.0 Hrs.	43113
<b>100326_A</b>	March 26,2010	SN53	485174.5	497524.5	3.4 Hrs.	24700

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# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## **Field Work / Procedures**

Multiple ground GPS Base Stations, for the LiDAR data collection, were set up every mission. One GPS ground base station was always set up at the airport of operation and another base station was set as an auxiliary base station or placed under or close to the flight lines for that day's mission.

See GPS Base Station Locations Diagram Below.

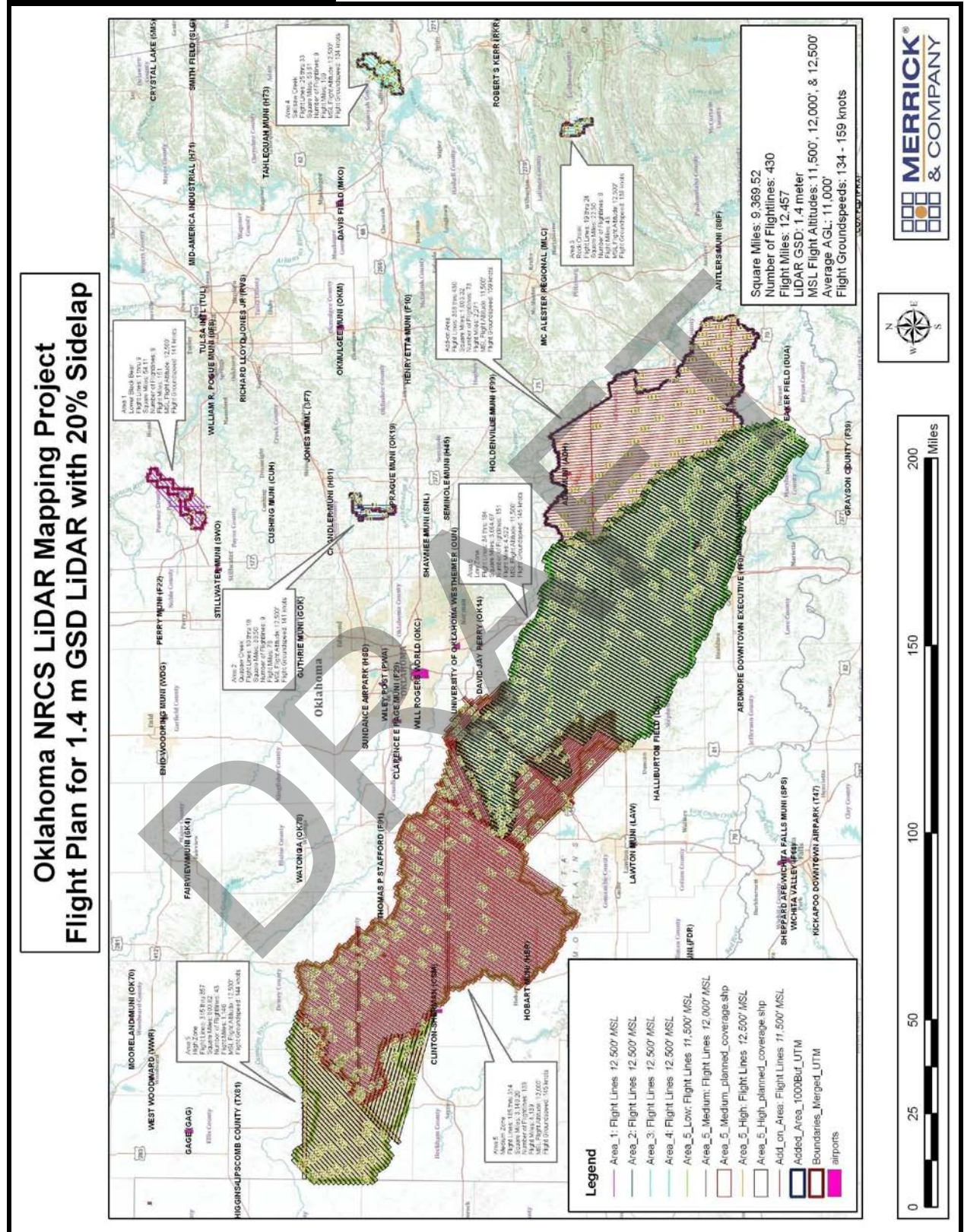
Pre-flight checks such as cleaning the sensor head glass are performed. A five minute INS initialization is conducted on the ground, with the aircraft engines running, prior to the flight mission. To establish fine-alignment of the INS GPS, ambiguities are resolved by flying within ten kilometers of the GPS base stations. During the data collection, the operator recorded information on log sheets which includes weather conditions, LiDAR operation parameters, and flight line statistics. Near the end of the mission, GPS ambiguities were again resolved by flying within ten kilometers of the GPS base stations to aid in post-processing. Data was sent back to the main office and preliminary data processing was performed for quality control of GPS data and to ensure sufficient overlap between flight lines. Any problematic data could then be reflown immediately as required. Final data processing was completed in the Aurora, Colorado office.

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# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

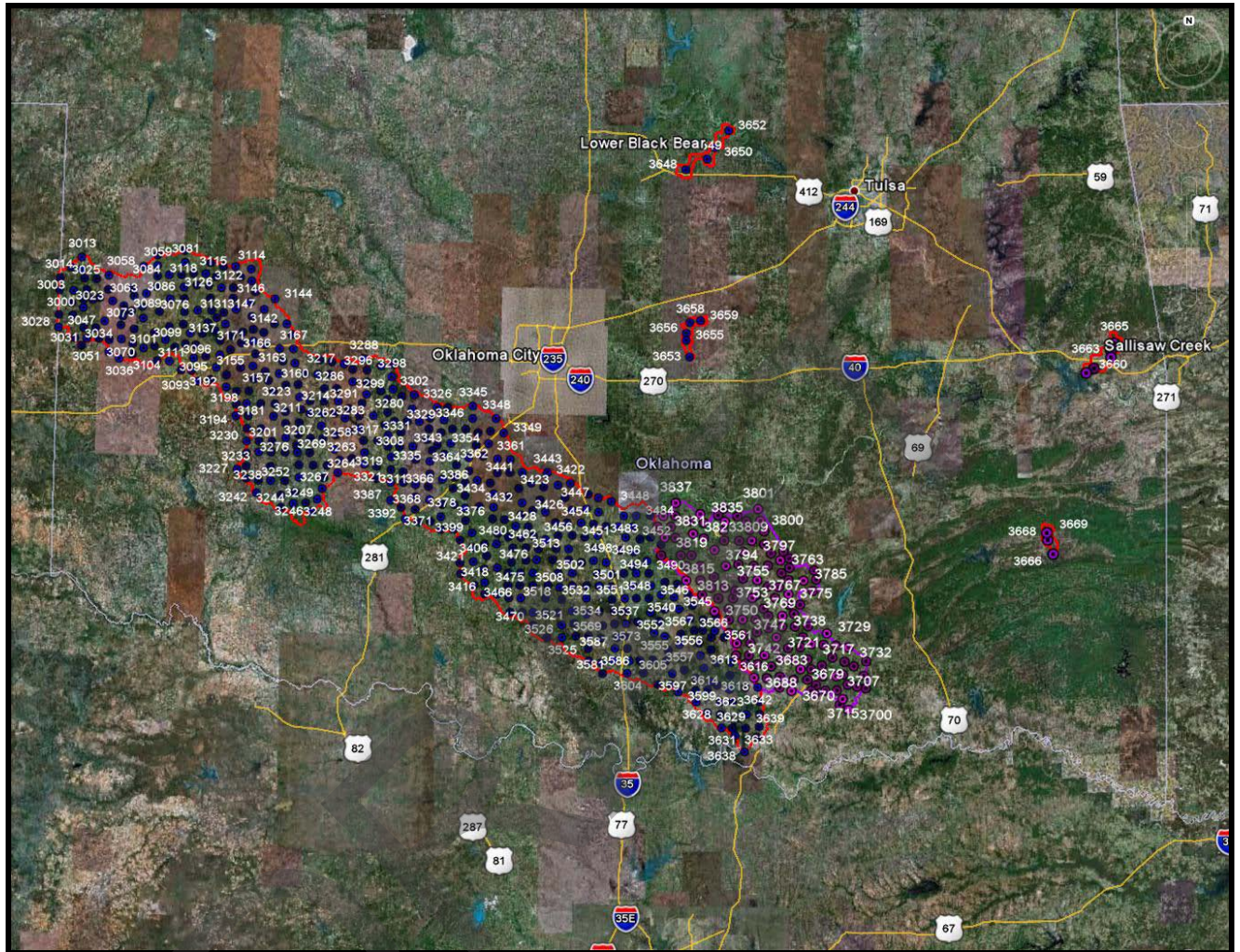
## Planned Flight Line Diagram





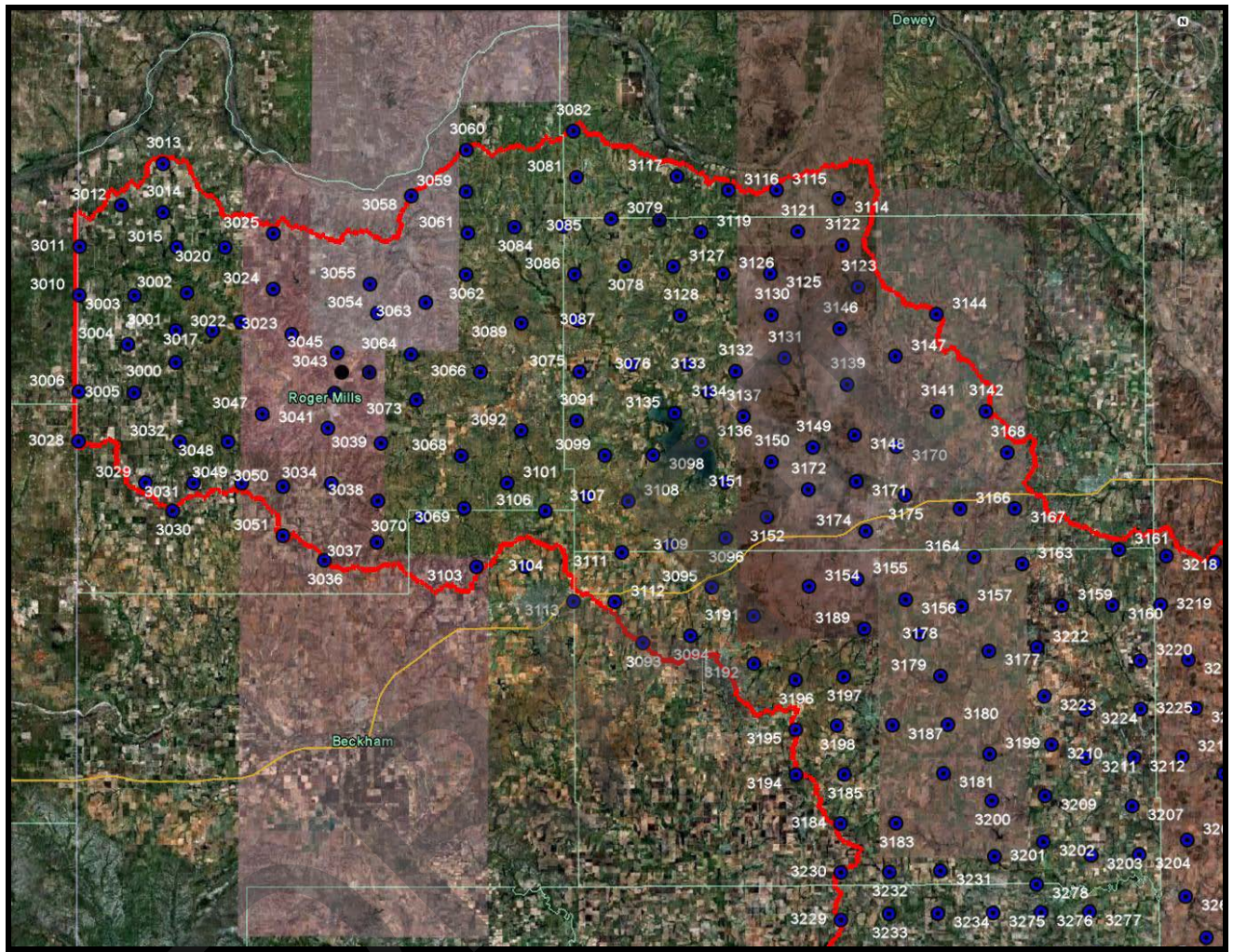
# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## Ground Control Checkpoints All



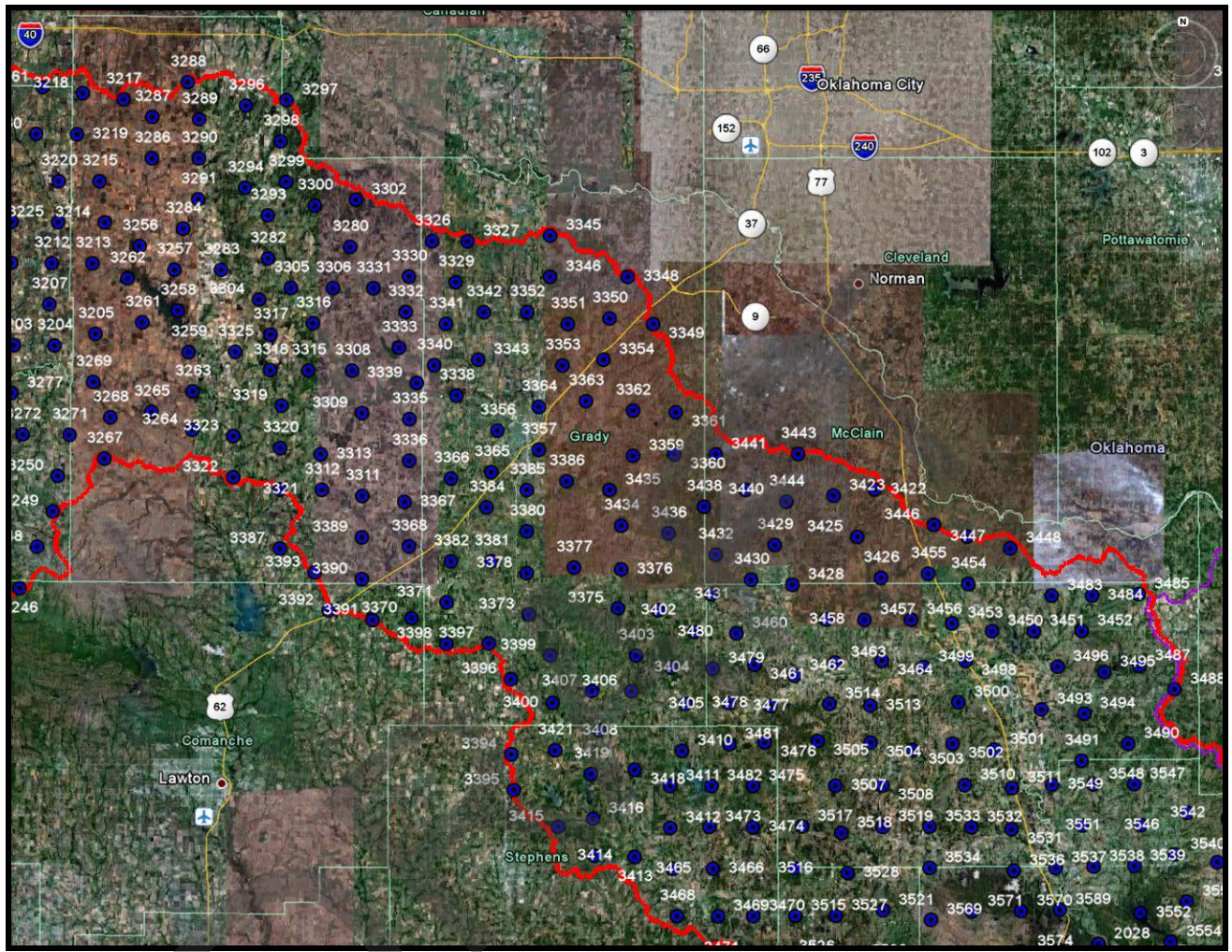
# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## Ground Control Checkpoints Main Area Part 1



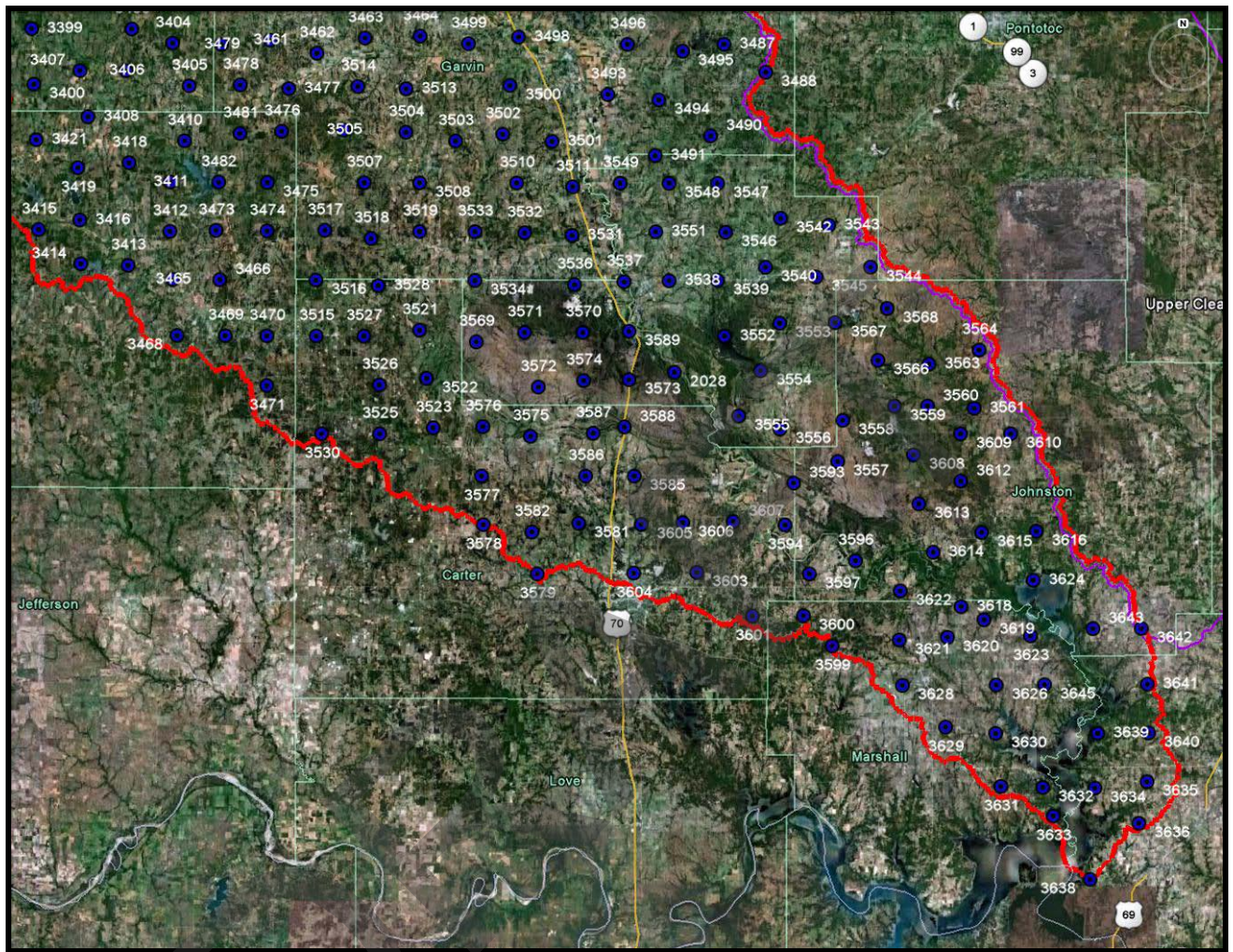
# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## Ground Control Checkpoints Main Area Part 2



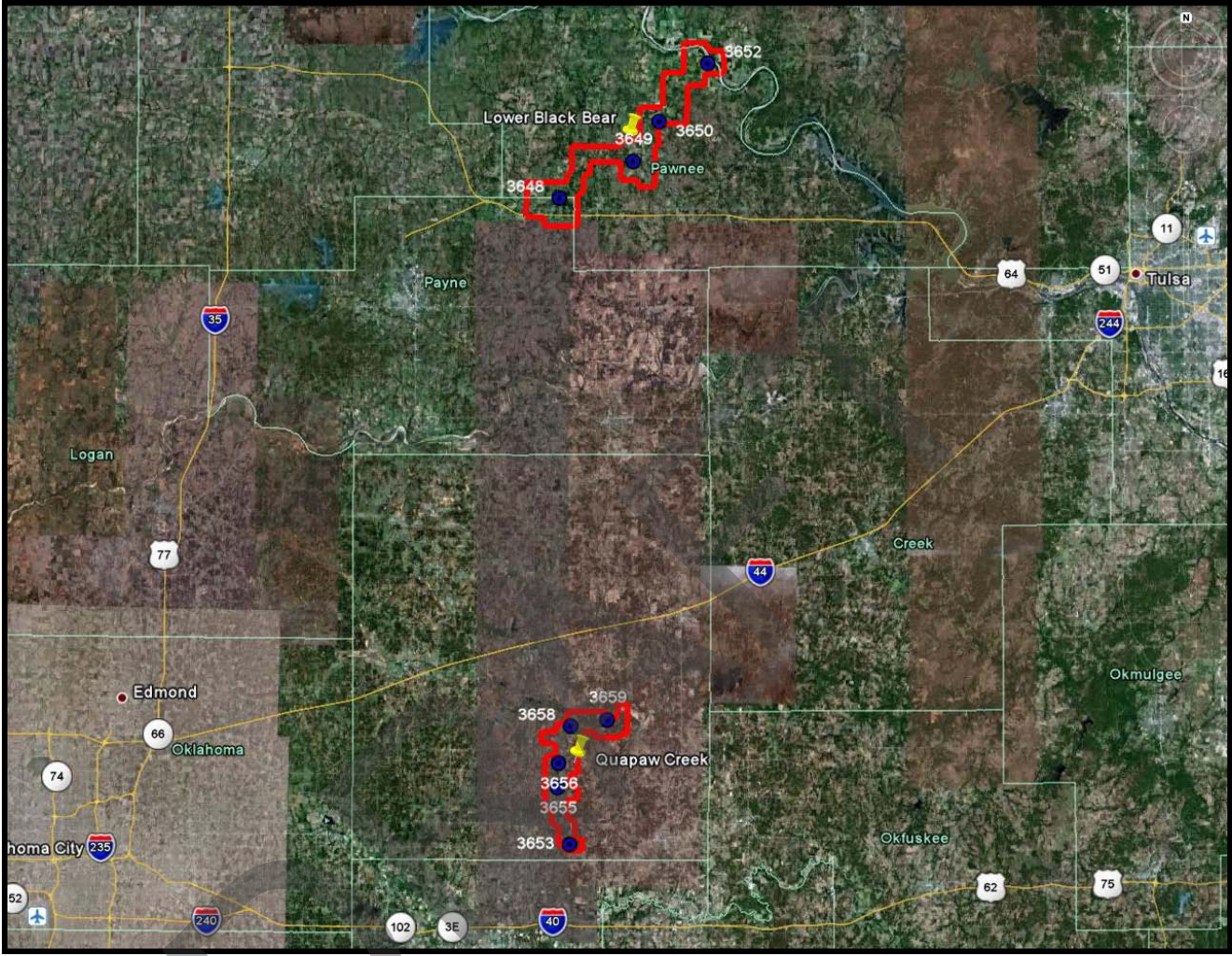
# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## Ground Control Checkpoints Main Area Part 3



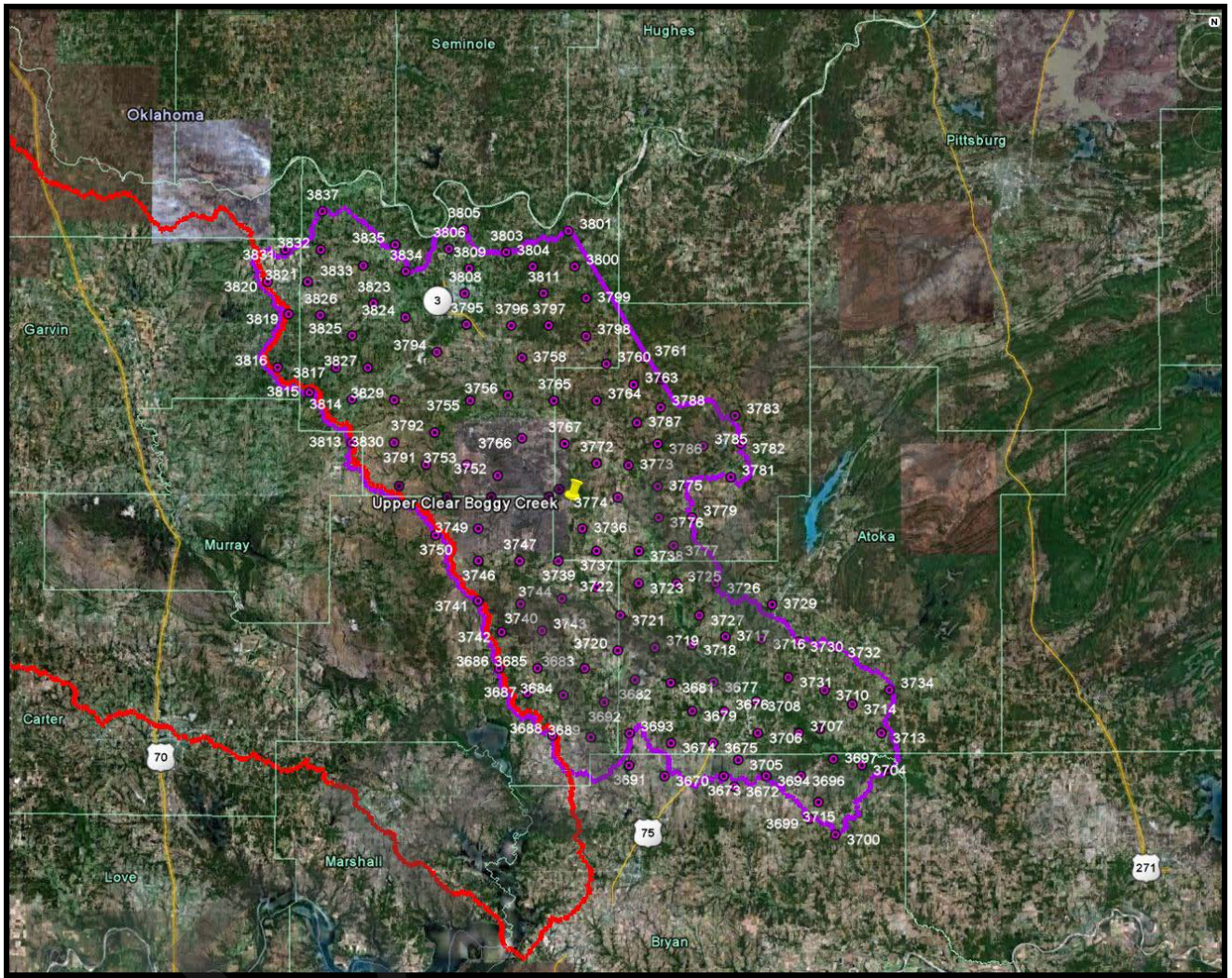
# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## Ground Control Checkpoints Part 4



# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

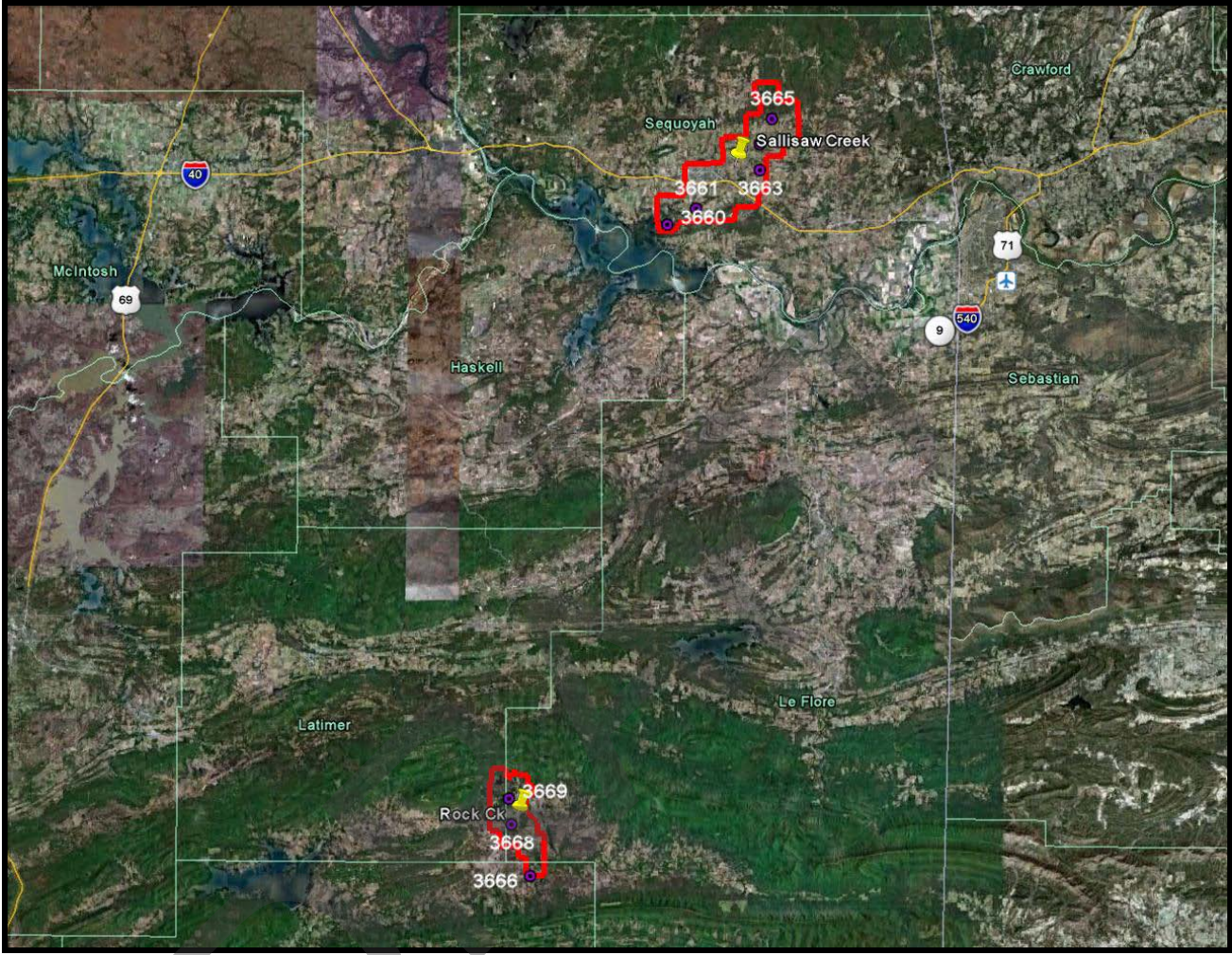
## Ground Control Checkpoints Add-on





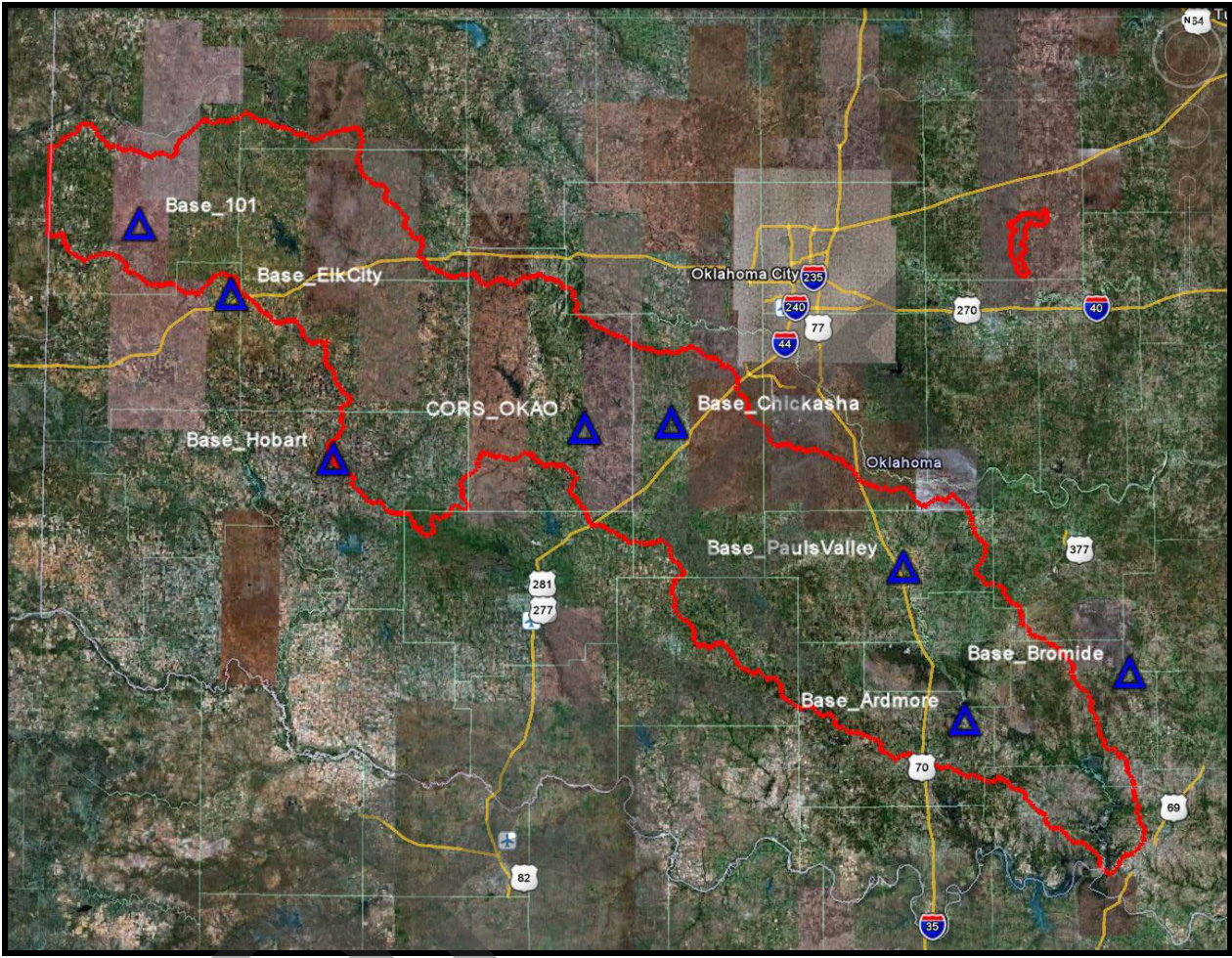
# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## Ground Control Checkpoints Part in Zone UTM 15



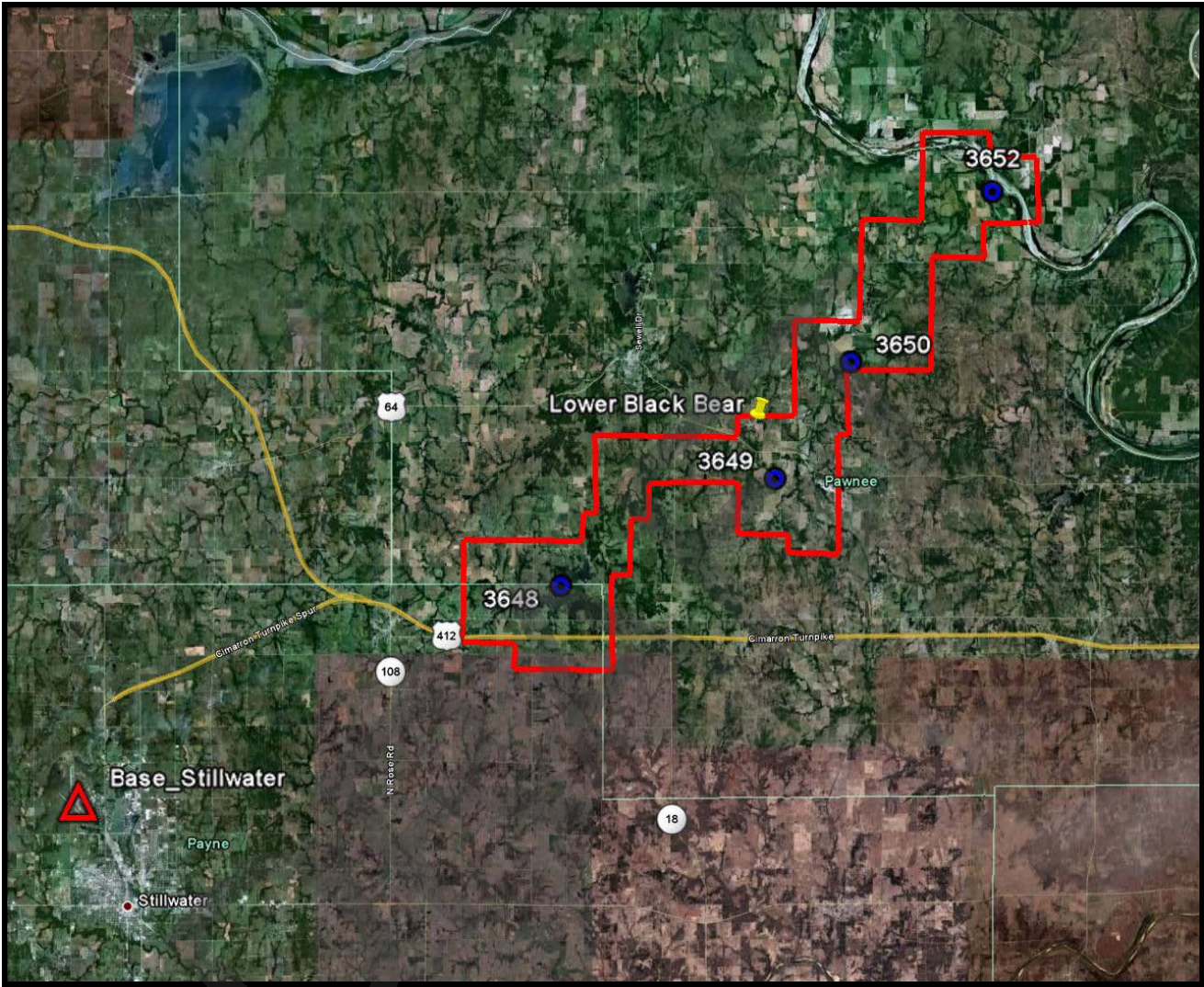
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LiDAR Mapping Report

Base Stations for Main Area



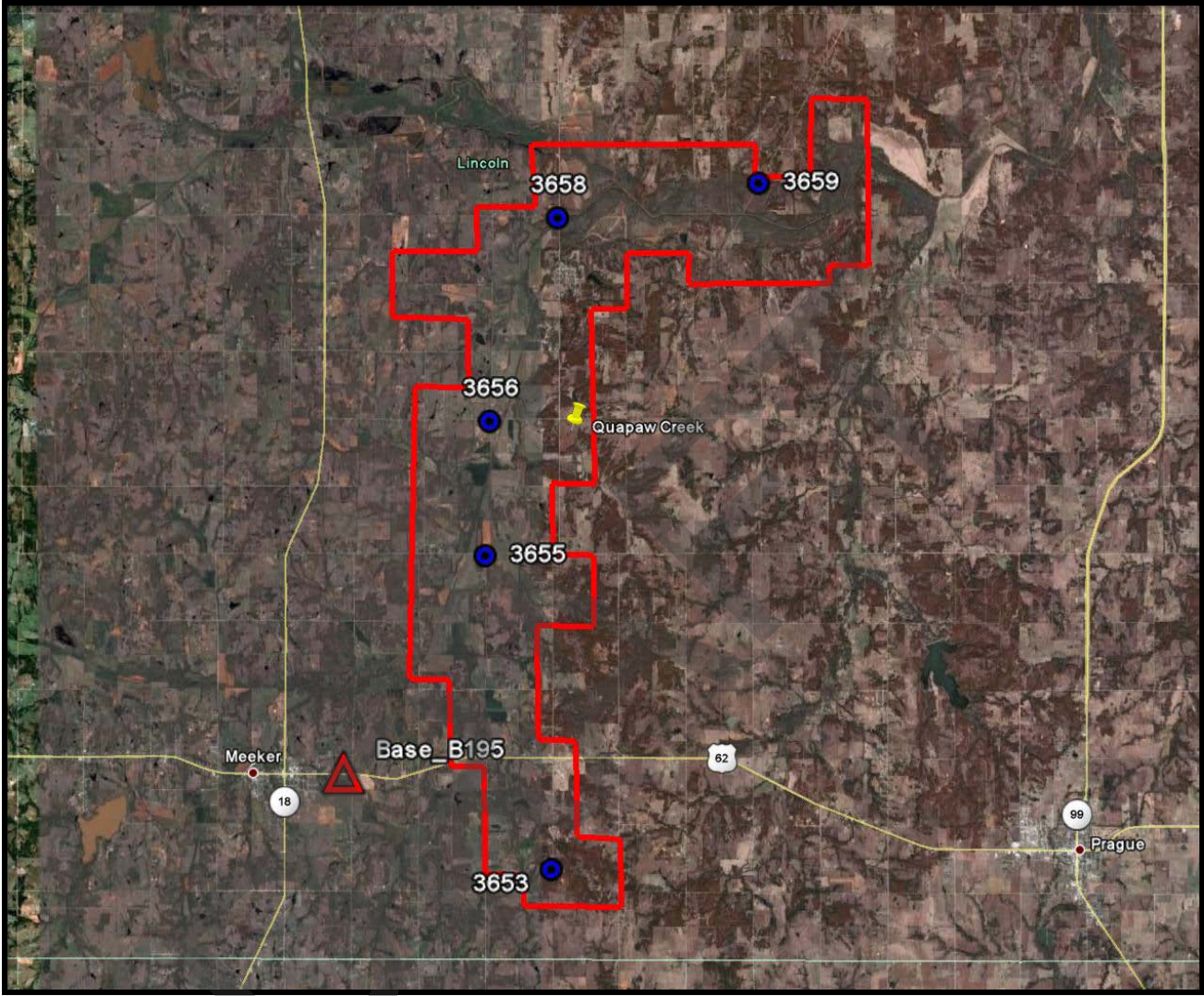
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LiDAR Mapping Report

**Base Station and Ground Control for NW Area (Lower Black Bear)**



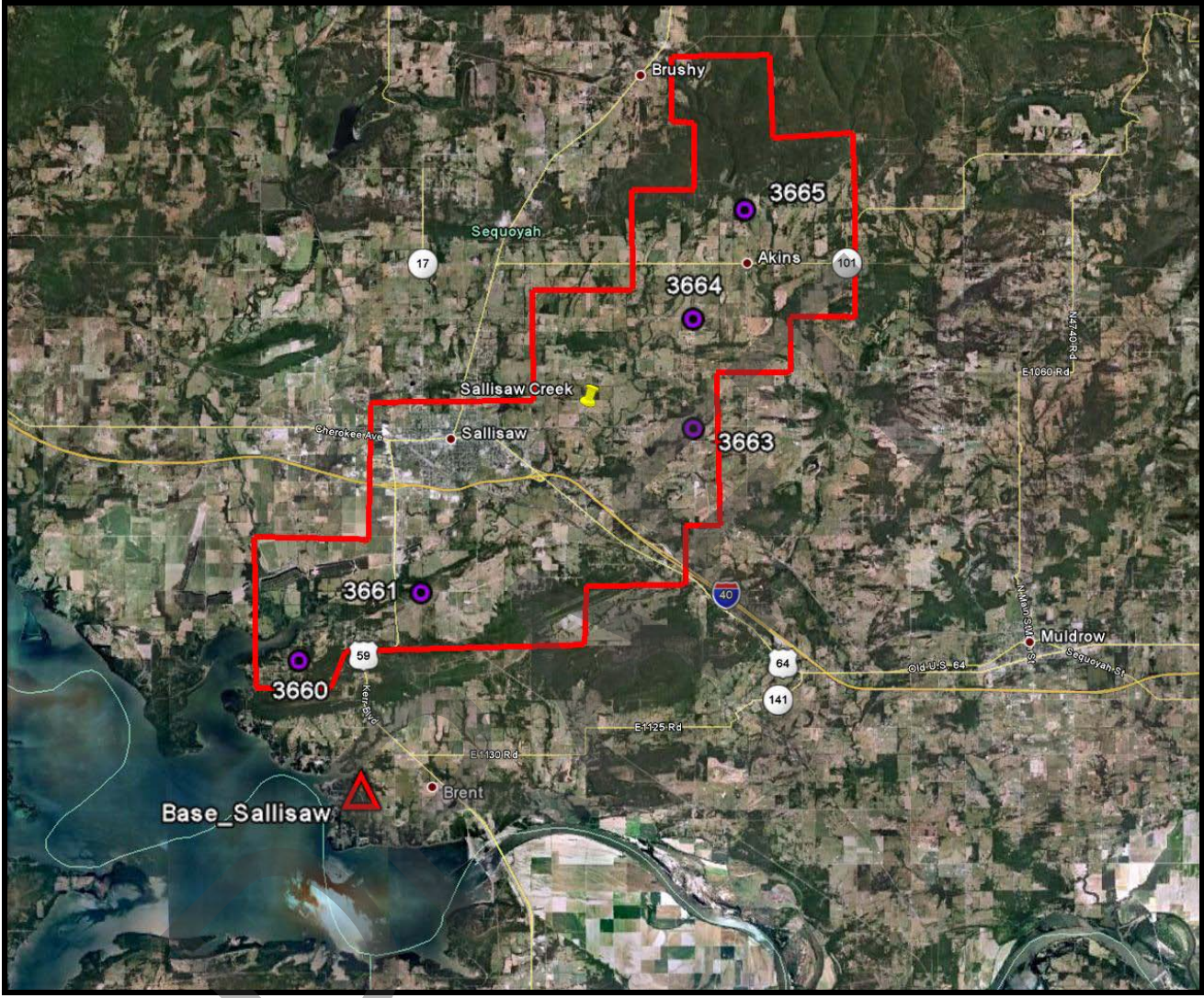
NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report

**Base Station and Ground Control for SW Area (Quapaw Creek)**



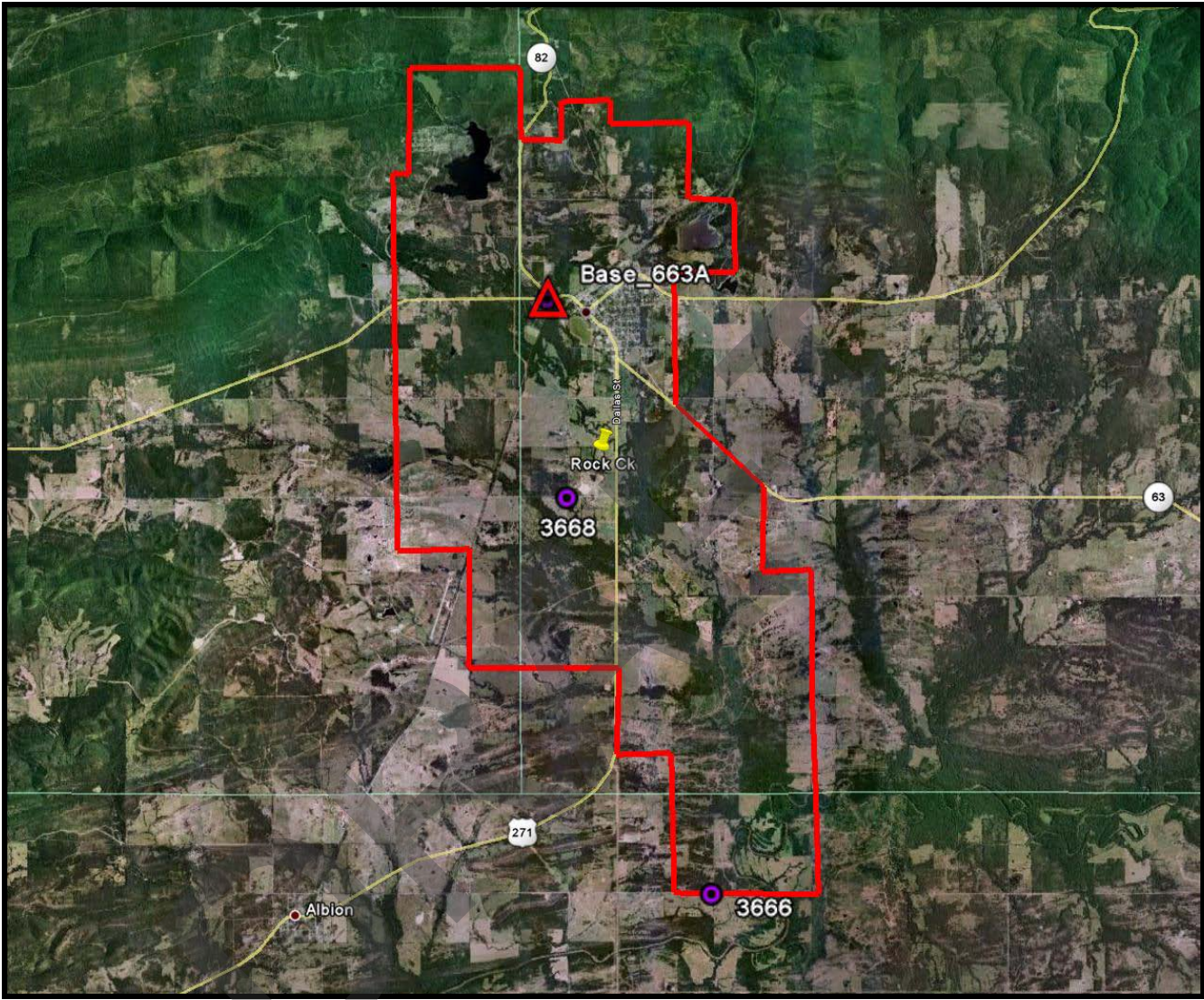
NRCS Oklahoma Dam Rehab  
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**Base Station and Ground Control for NE Area (Sallisaw Creek)**



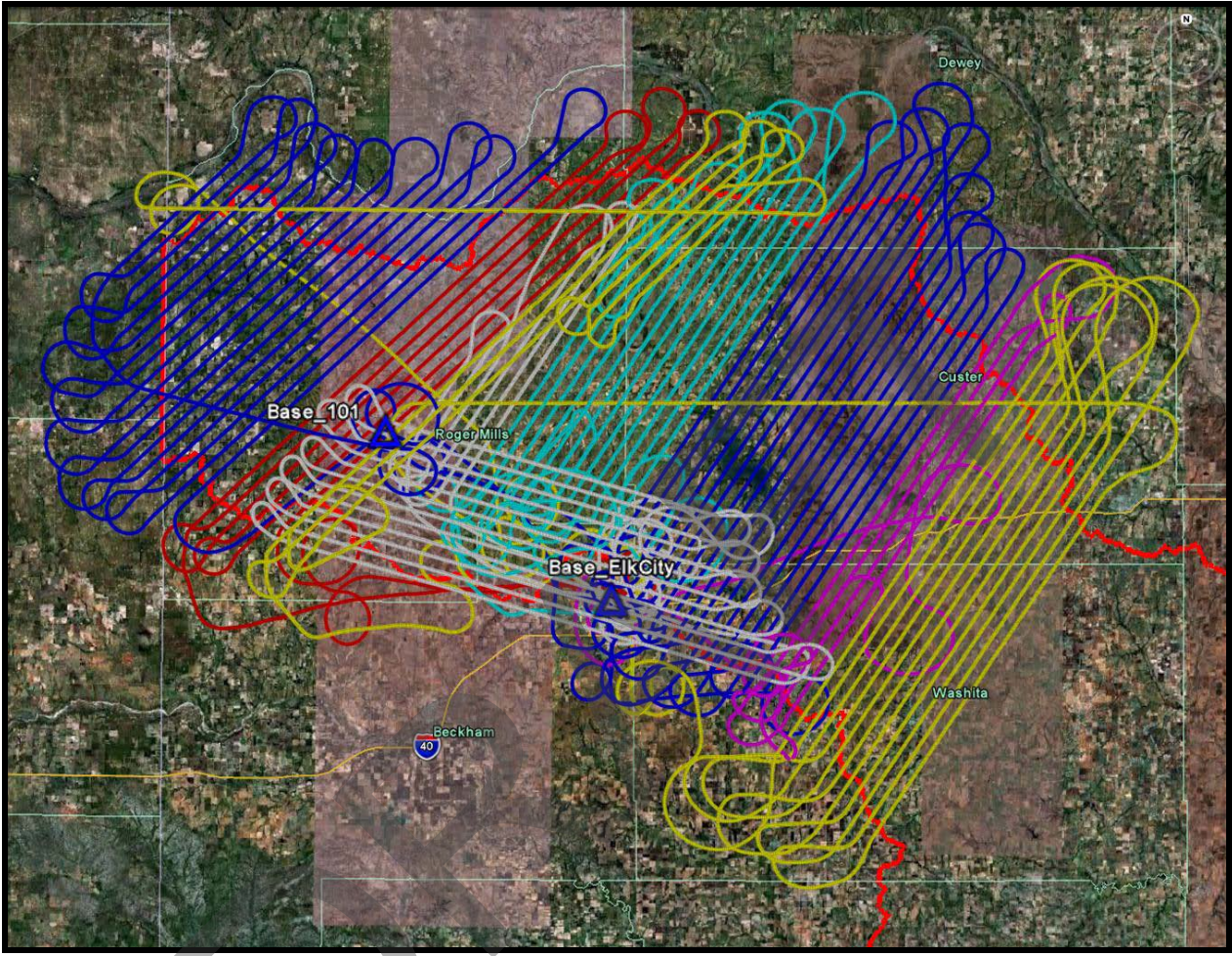
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Base Station and Ground Control for SE Area (Rock Creek)



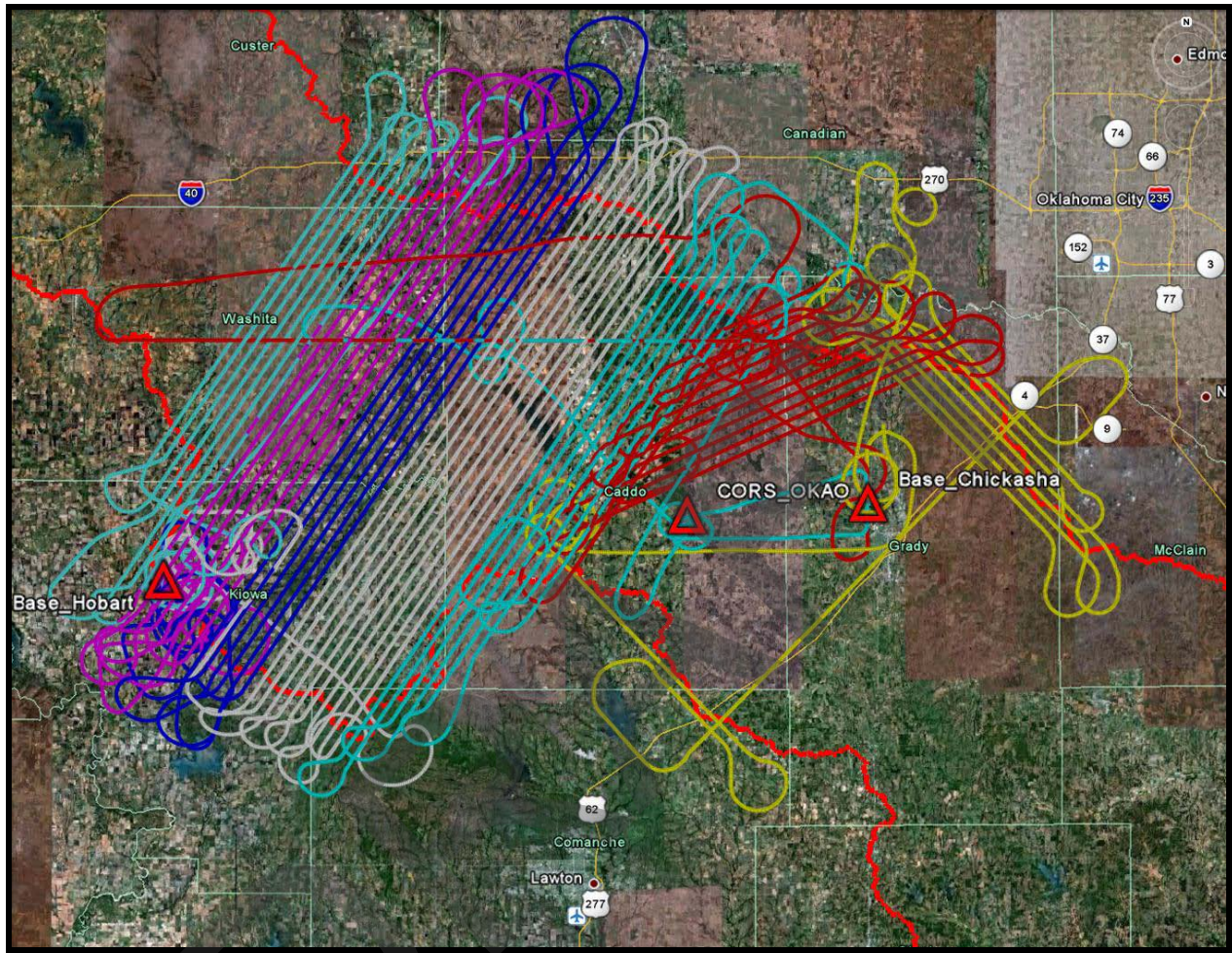
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LiDAR Mapping Report

Actual Flight Lines Showing Base Station Locations and colored mission by mission for missions 091204A thru 091210B



# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

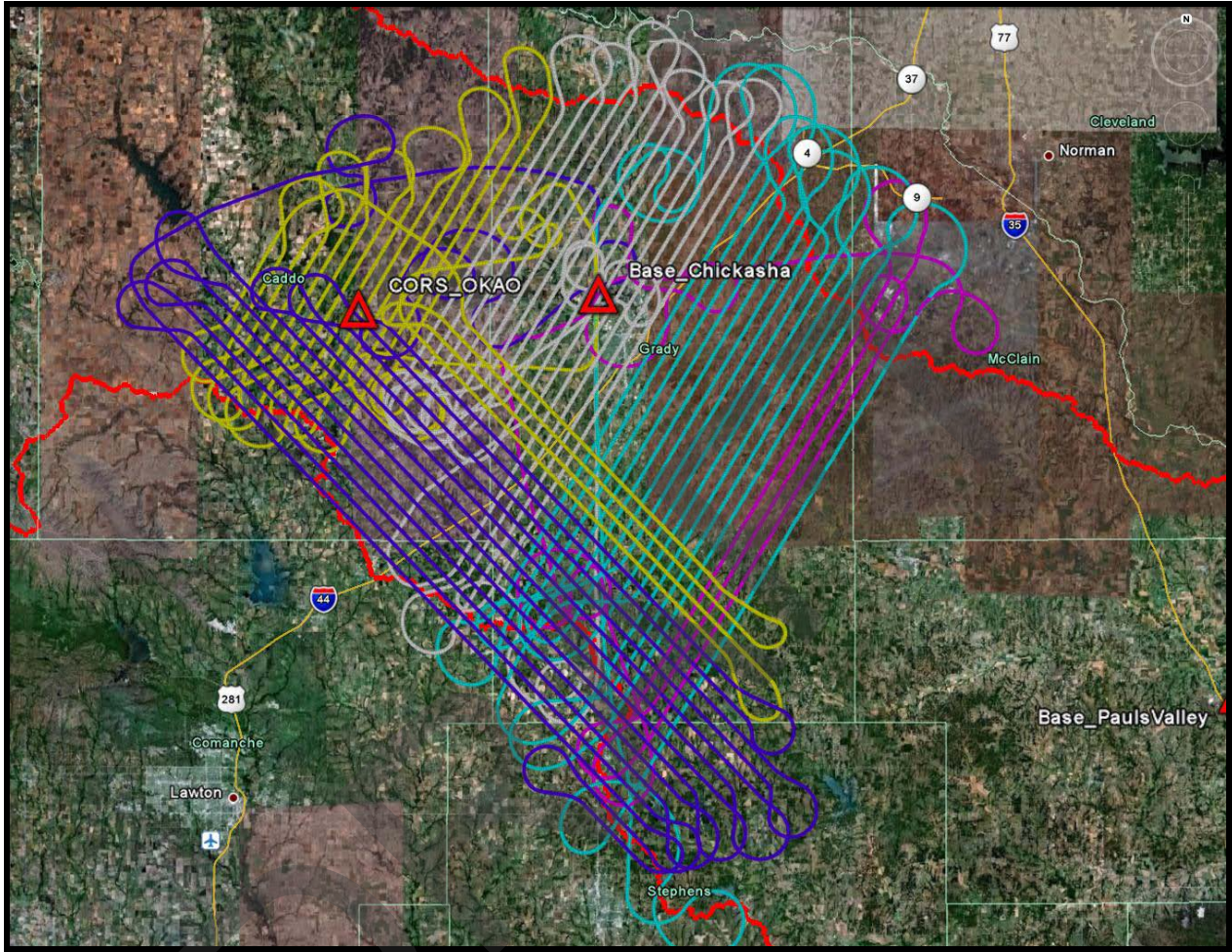
## Actual Flight Lines Showing Base Station Locations and colored mission by mission for missions 091212A thru 091216A





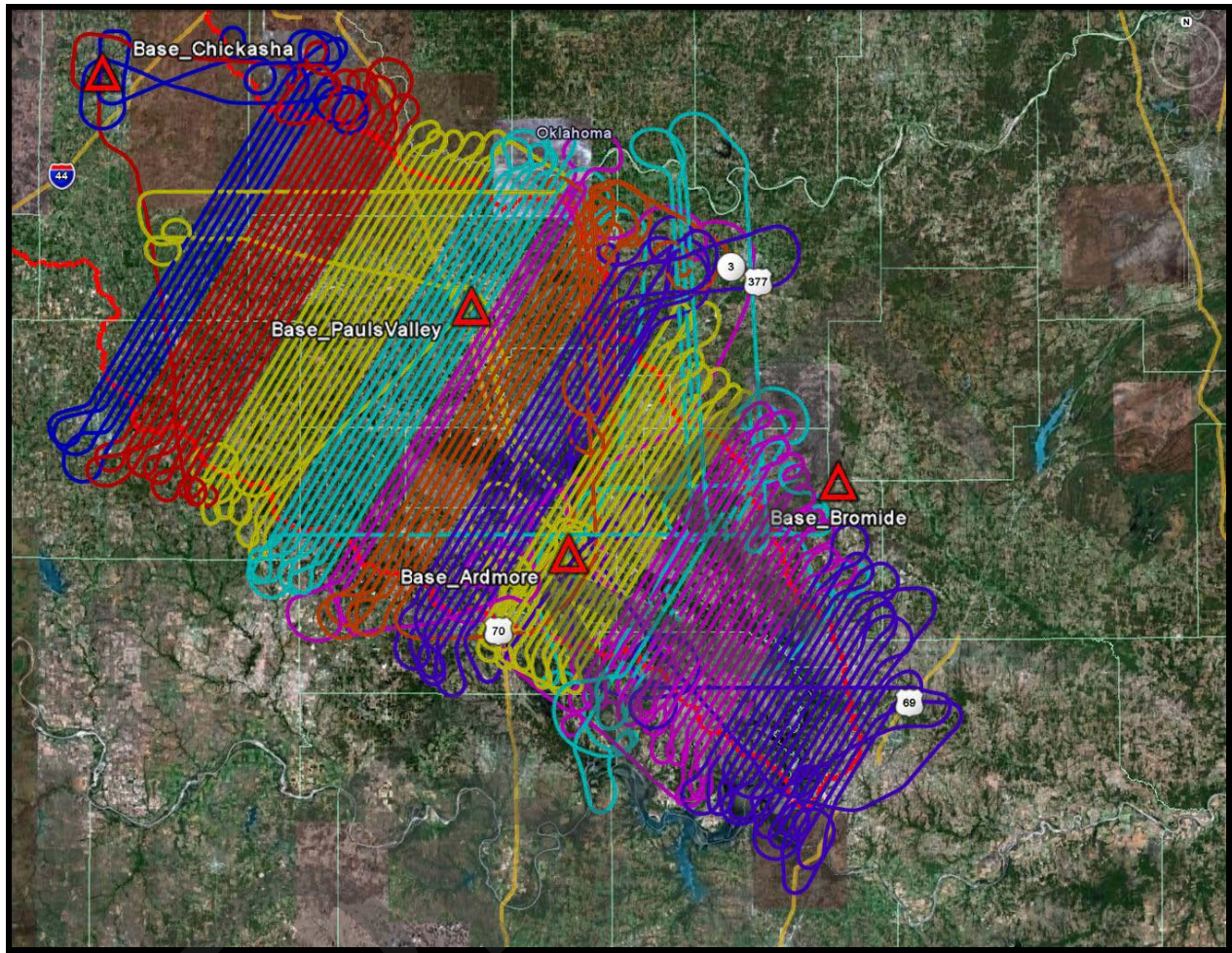
# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## Actual Flight Lines Showing Base Station Locations and colored mission by mission for missions 091217A thru 091219A



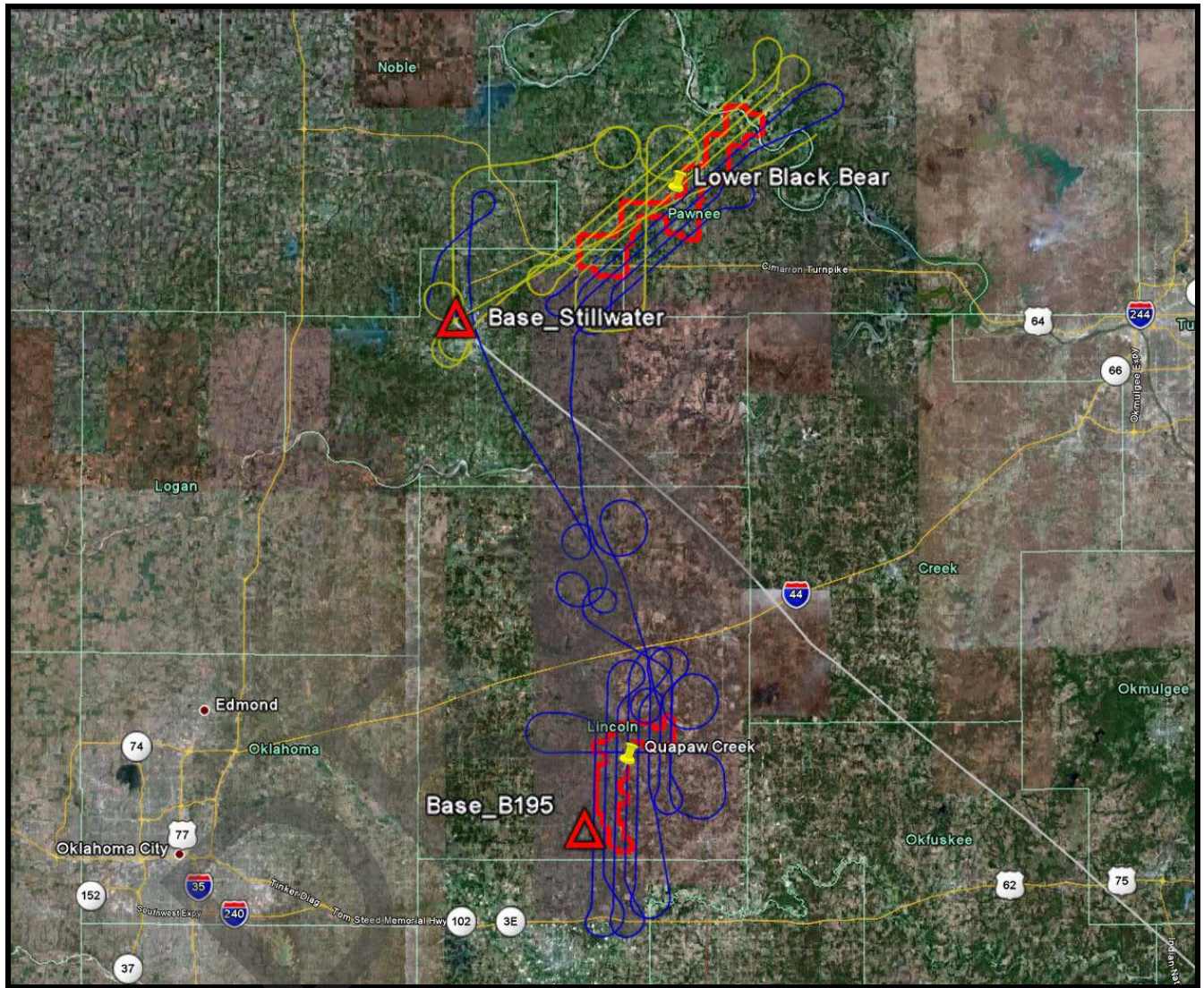
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Actual Flight Lines Showing Base Station Locations and colored mission by mission for missions 091220A thru 100126A and 100205A



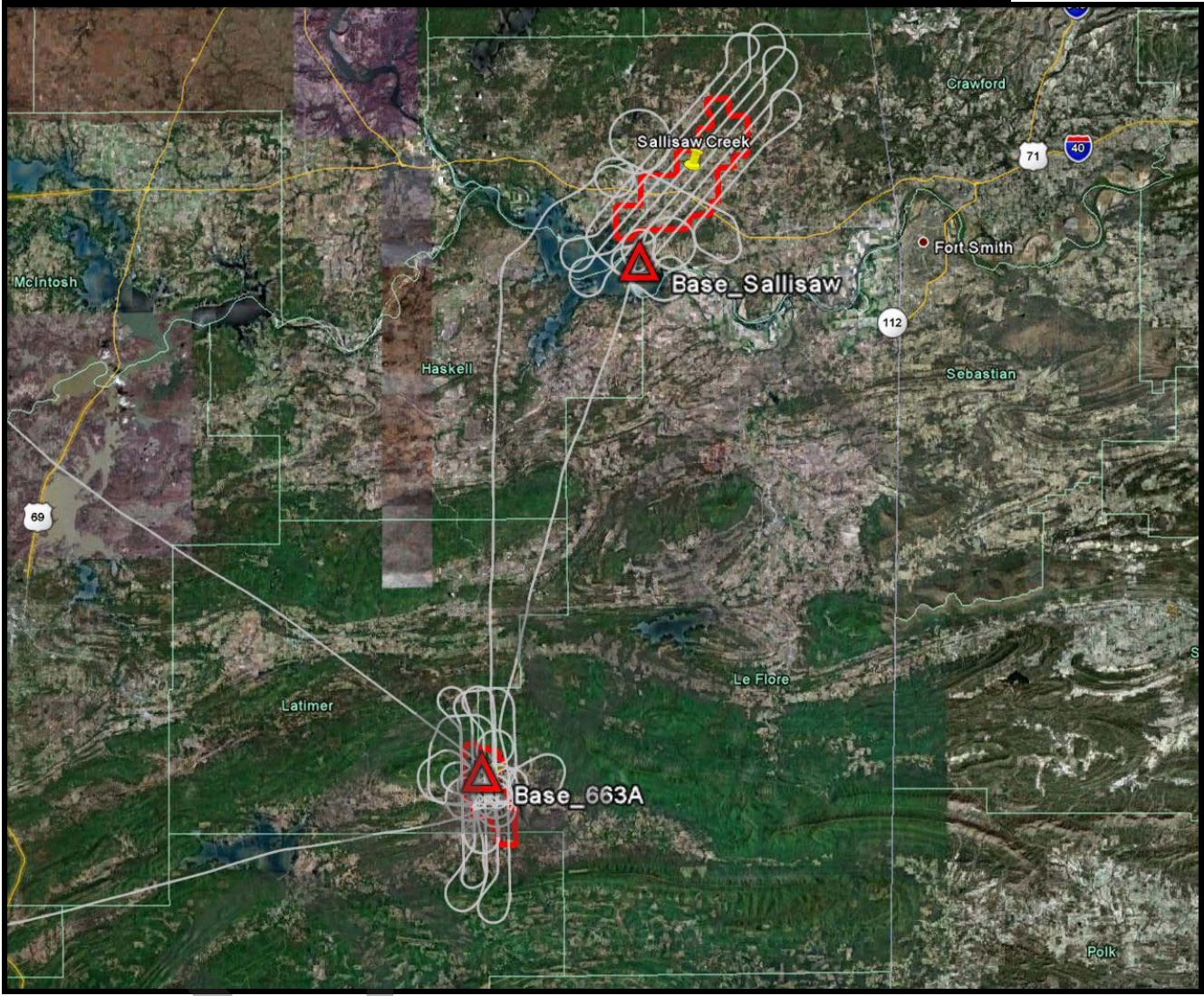
NRCS Oklahoma Dam Rehab  
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Actual Flight Lines Showing Base Station Locations and colored mission by mission for missions 100318A thru 100318B



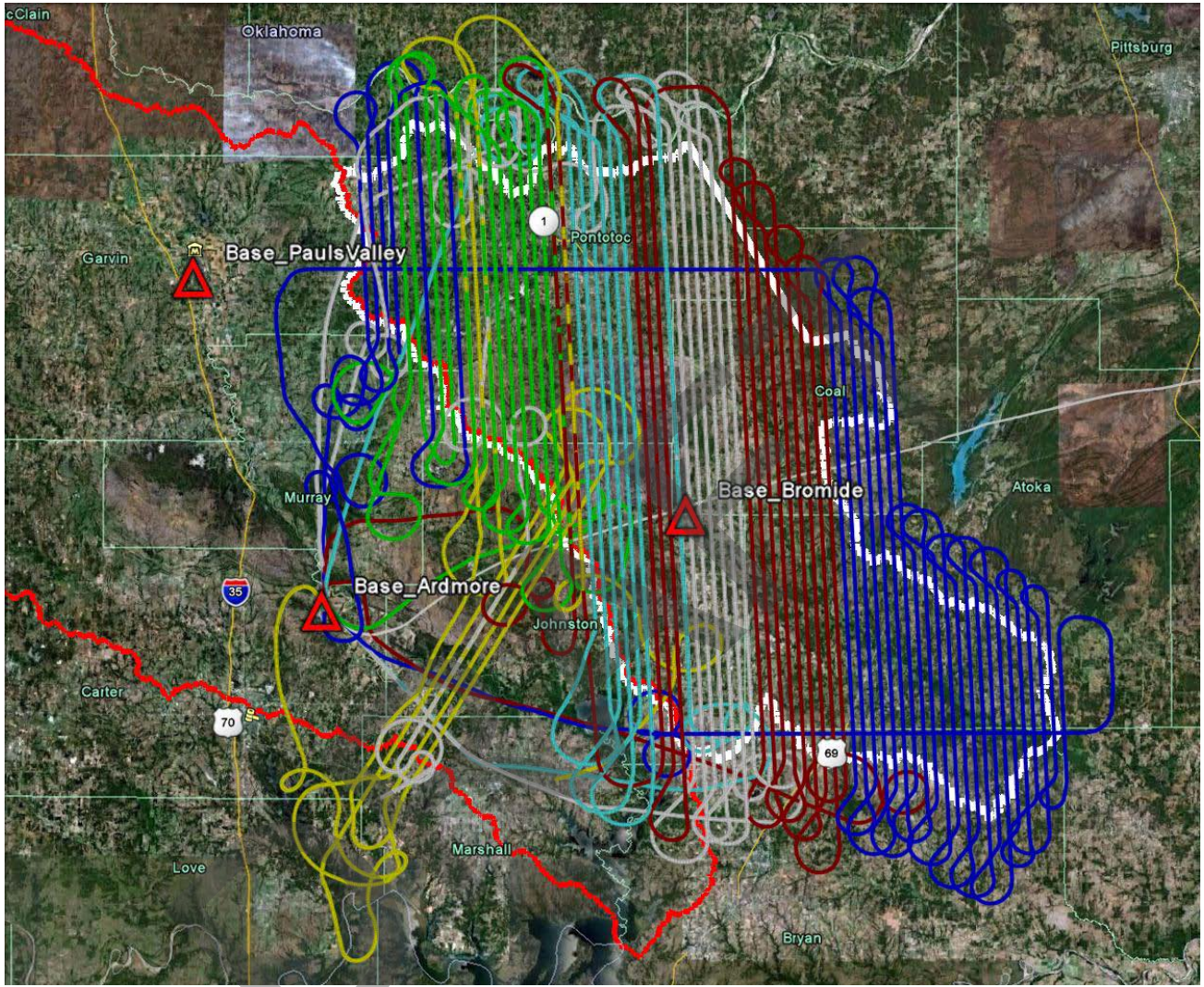
NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report

Actual Flight Lines Showing Base Station Locations for mission 100318C



NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report

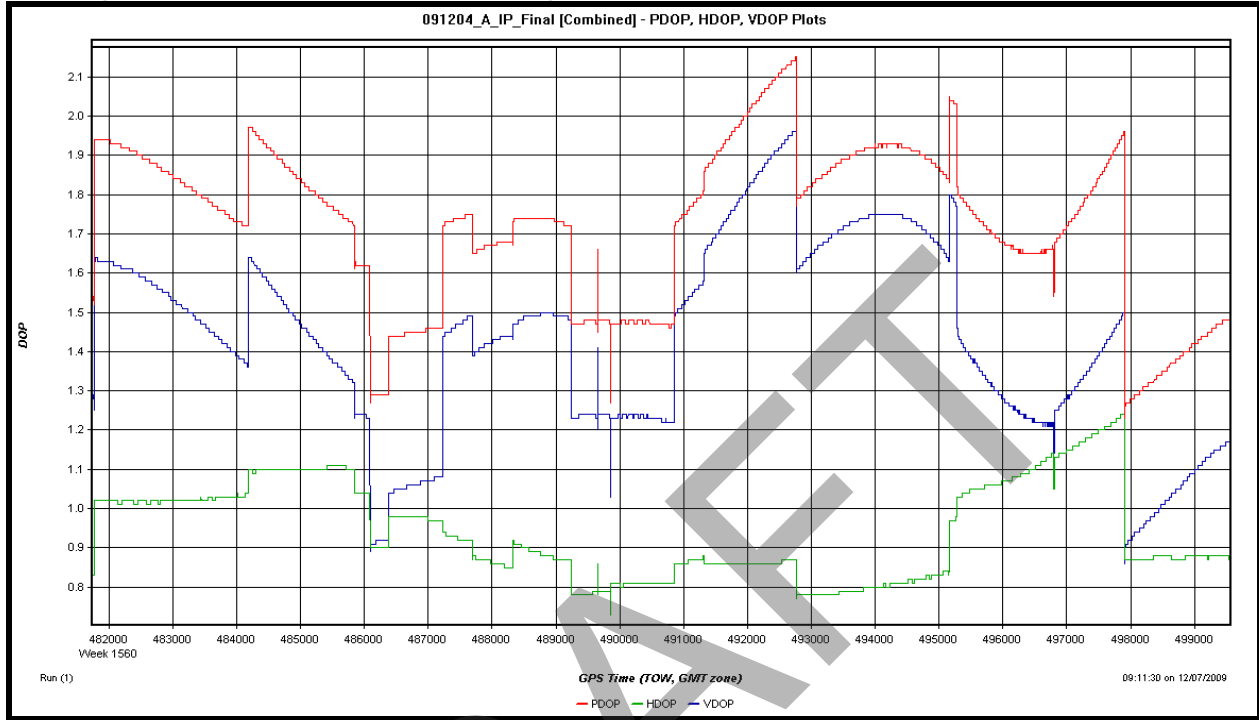
Actual Flight Lines Showing Base Station Locations and colored mission by mission for missions 100126B thru 100209B and 100322A thru 100326A



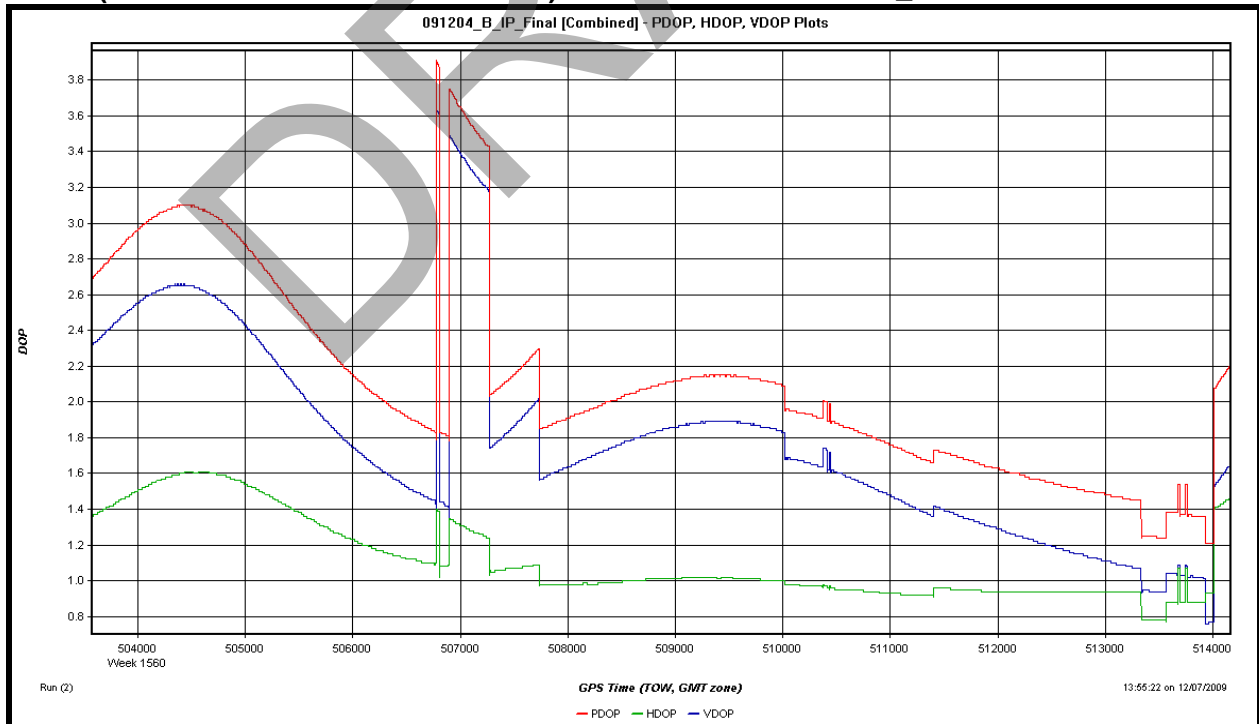
# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

The following graphs show the mission by mission GPS PDOP (Positional Dilution Of Precision) Plots.

## PDOP (Positional Dilution Of Precision) Plot for mission 091204\_A

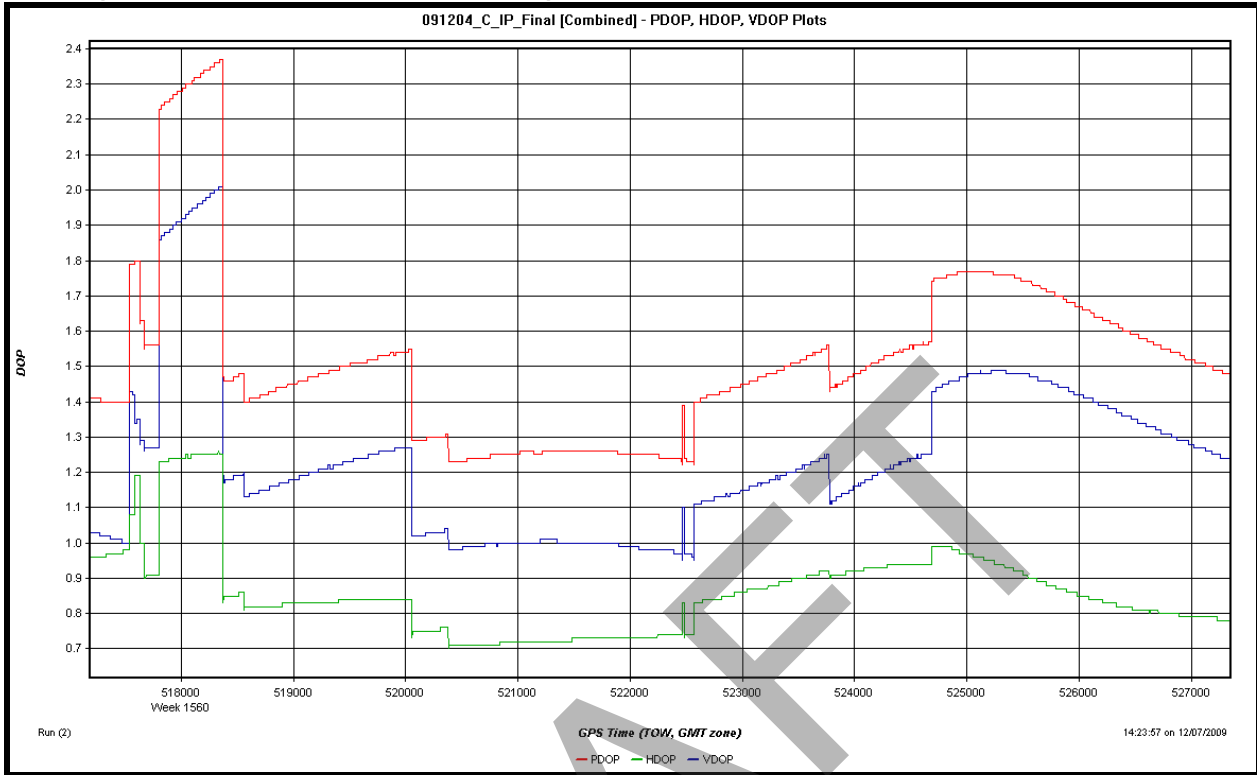


## PDOP (Positional Dilution Of Precision) Plot for mission 091204\_B

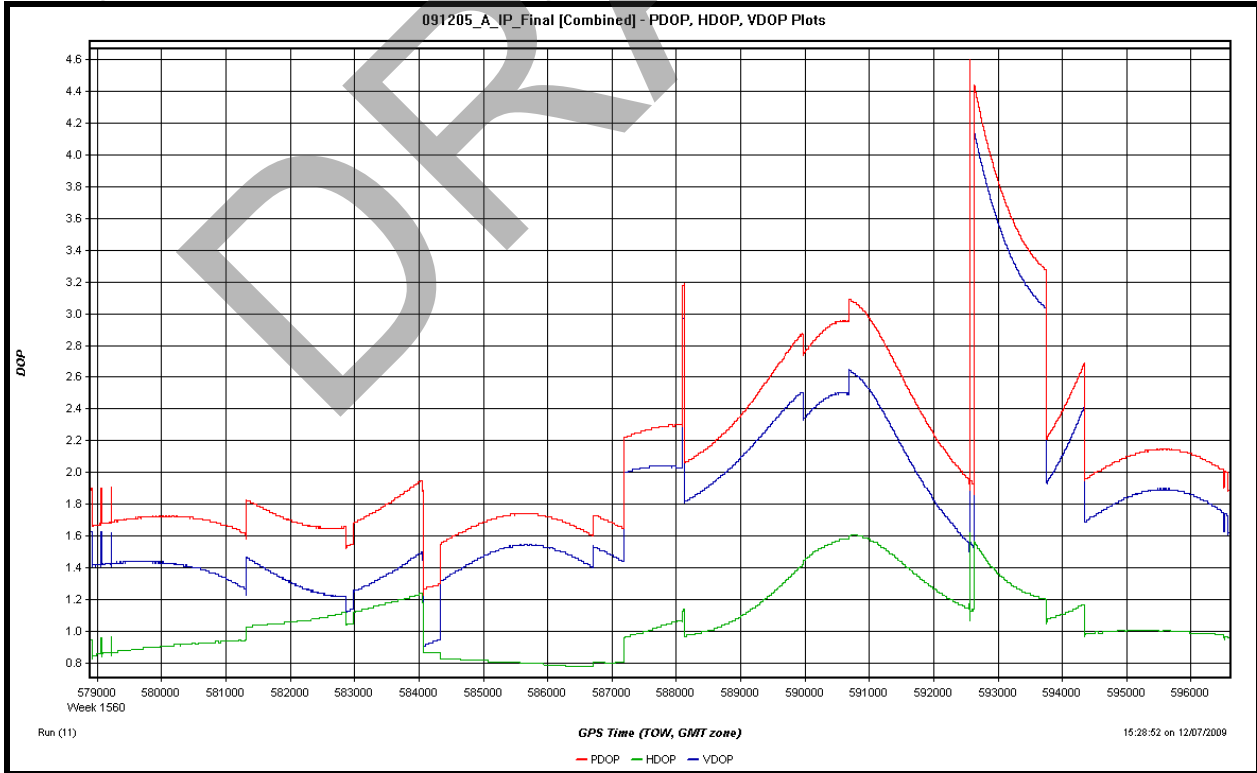


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 091204\_C

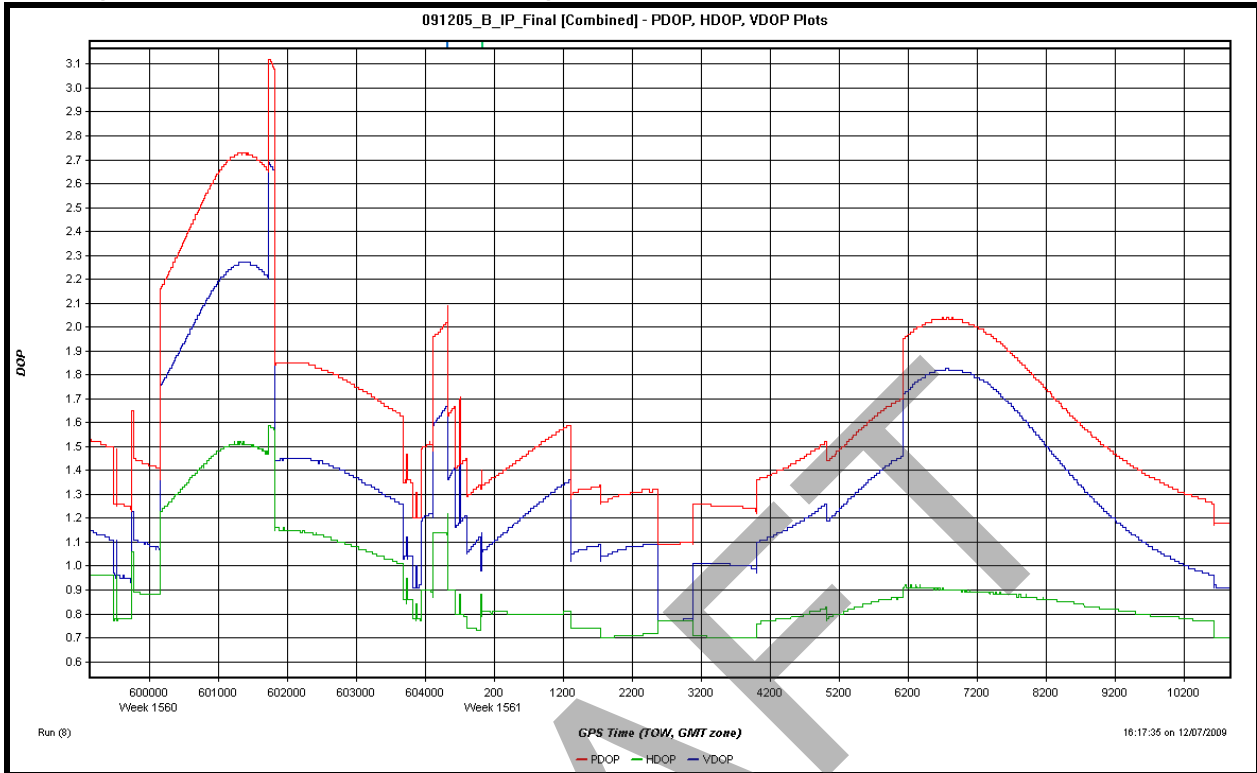


## PDOP (Positional Dilution Of Precision) Plot for mission 091205\_A

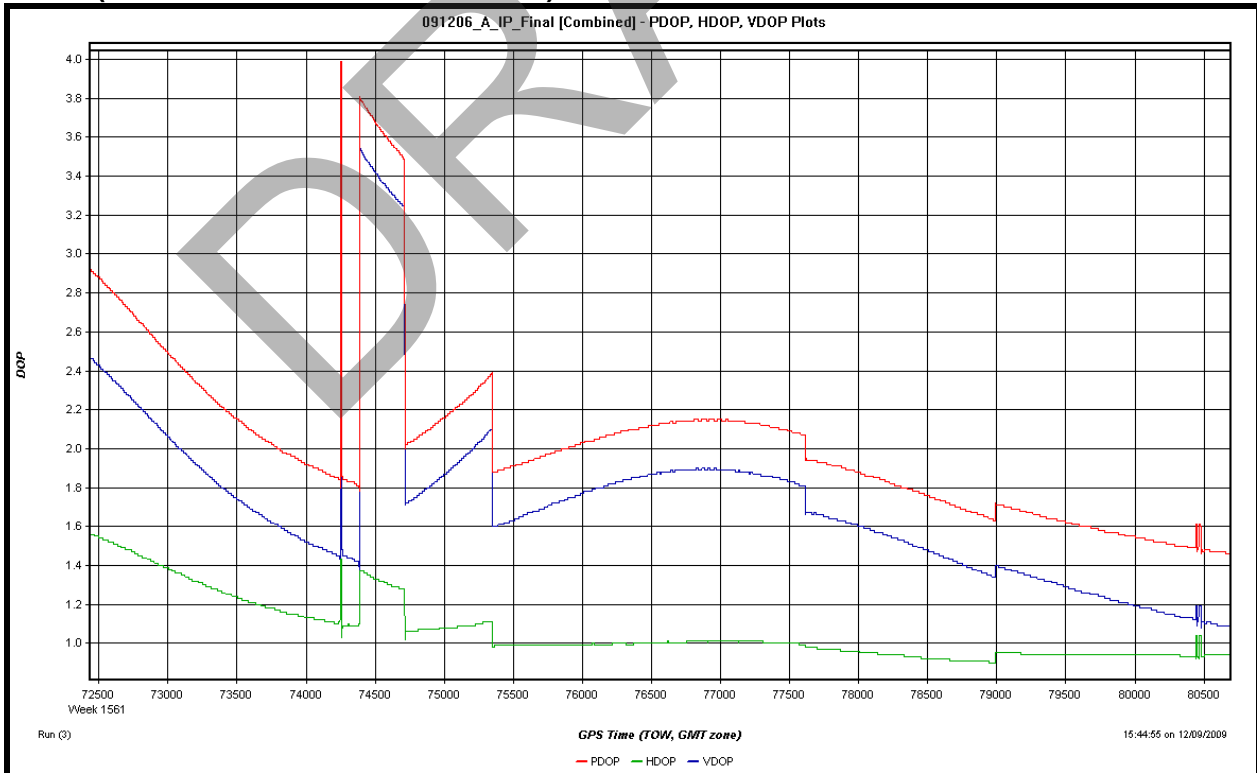


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 091205\_B



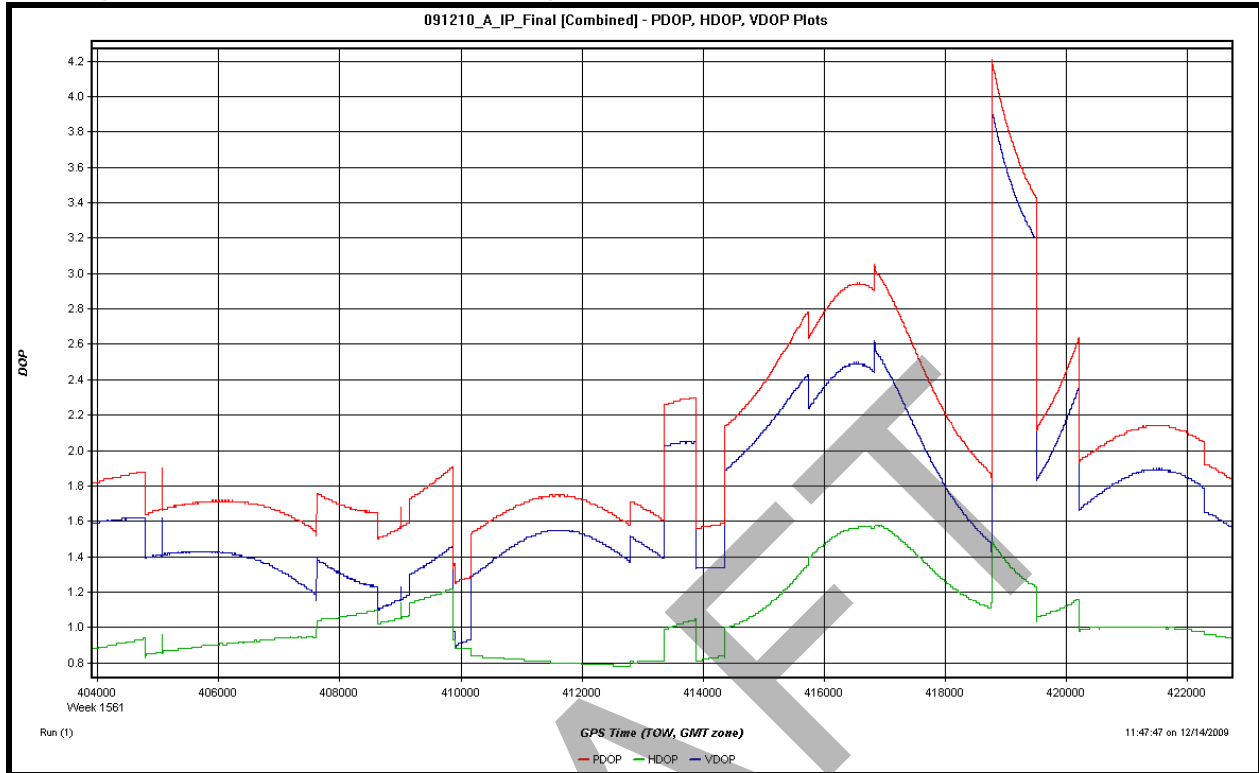
## PDOP (Positional Dilution Of Precision) Plot for mission 091206\_A



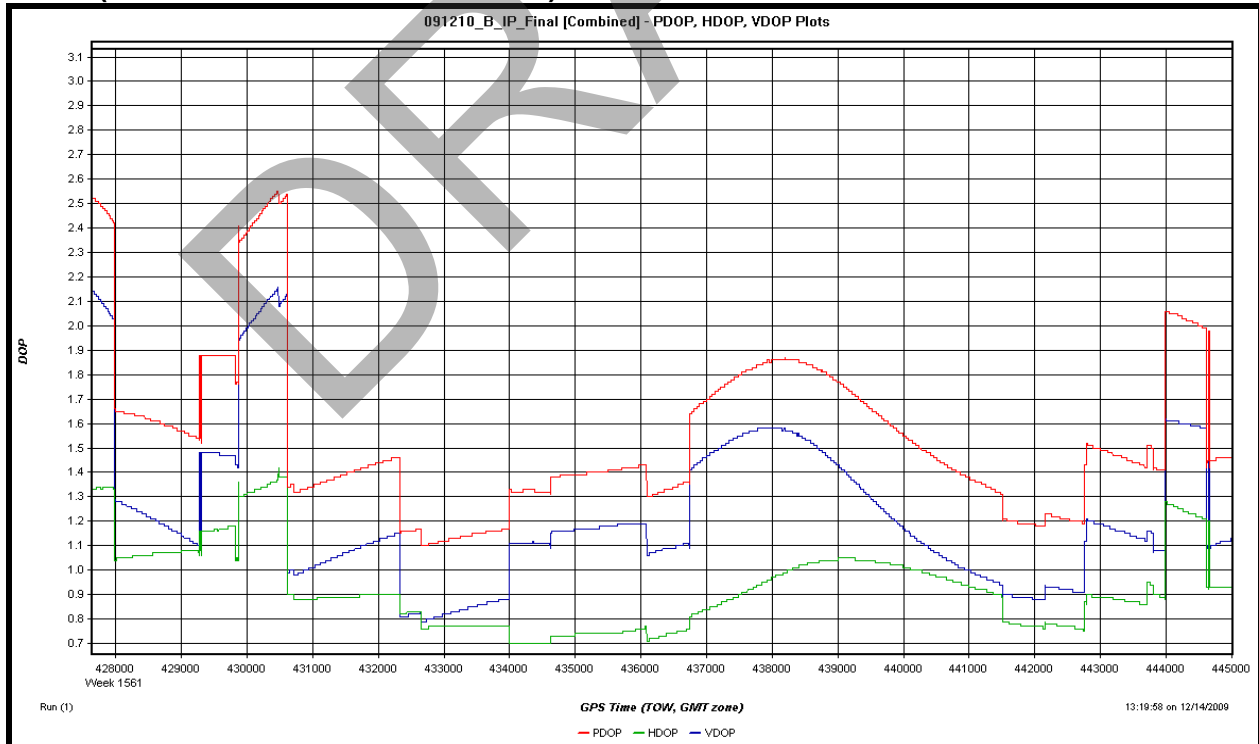


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 091210\_A

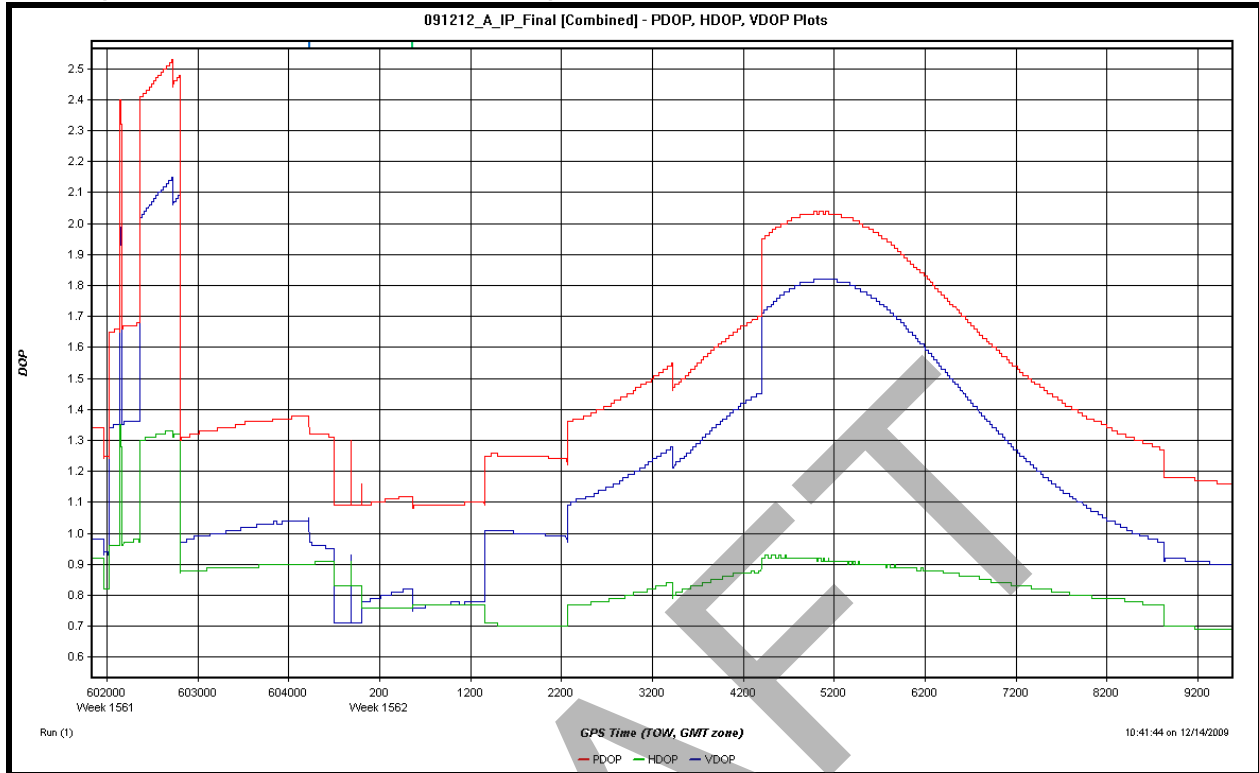


## PDOP (Positional Dilution Of Precision) Plot for mission 091210\_B

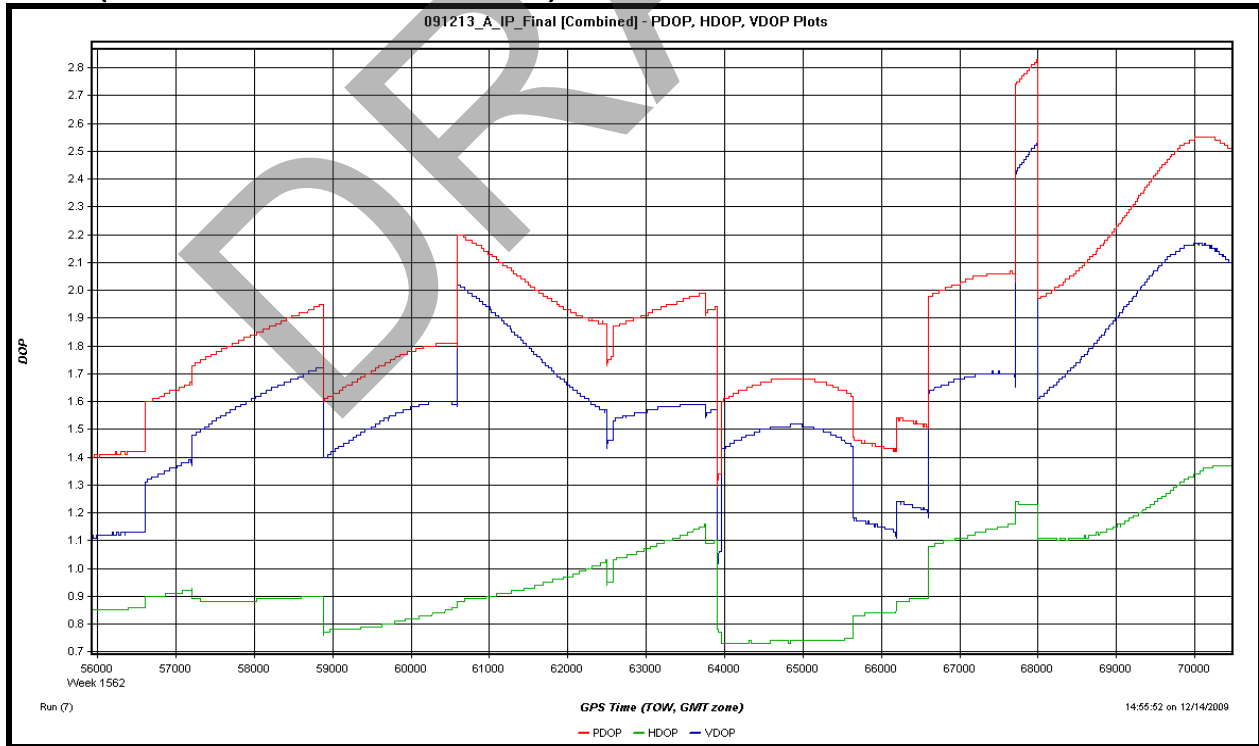


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 091212\_A

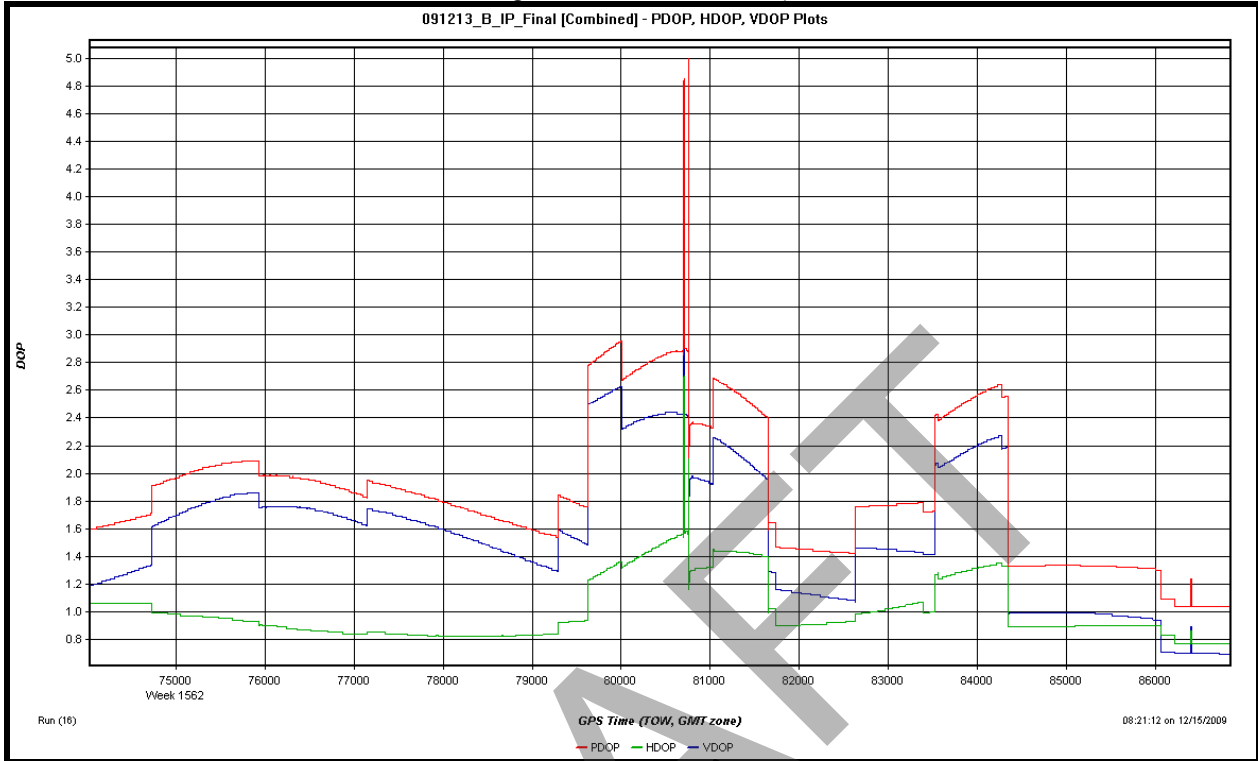


## PDOP (Positional Dilution Of Precision) Plot for mission 091213\_A

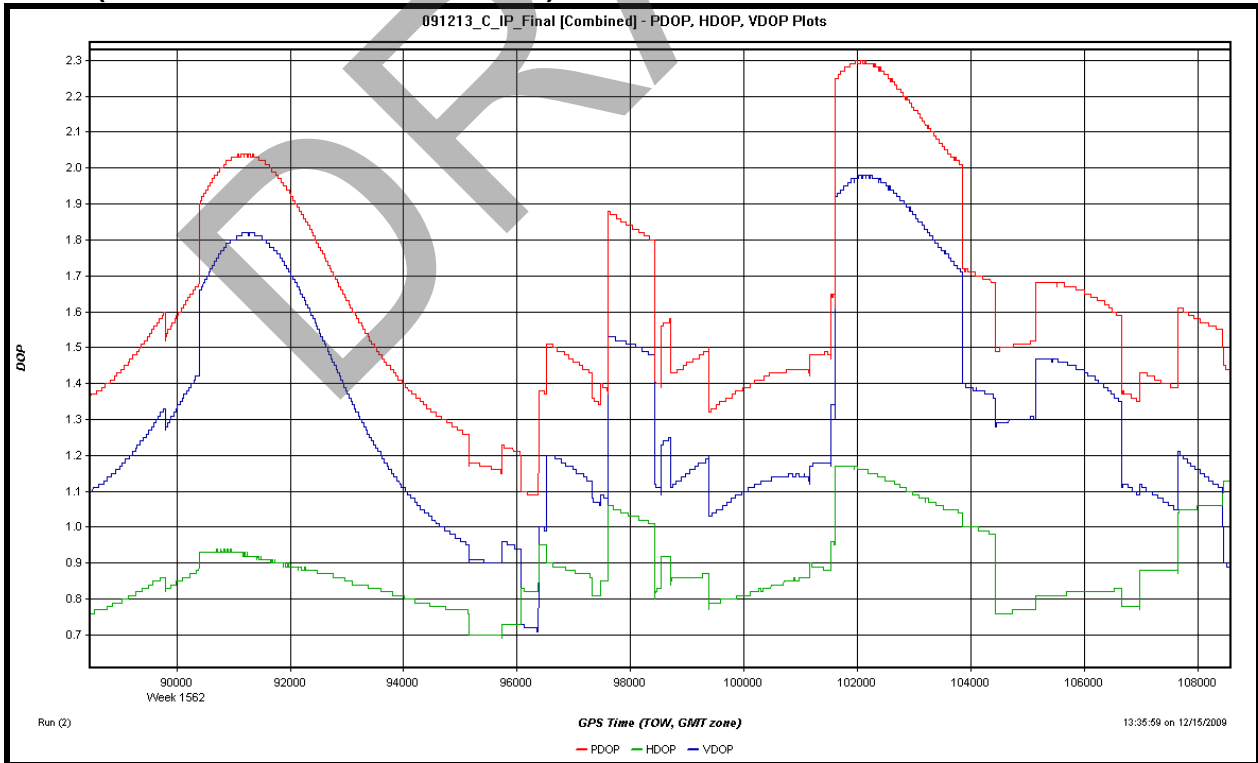


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

**PDOP (Positional Dilution Of Precision) Plot for mission 091213\_B** (Note: The PDOP shown that is above 4.0 DOP does not occur during a data collection time)

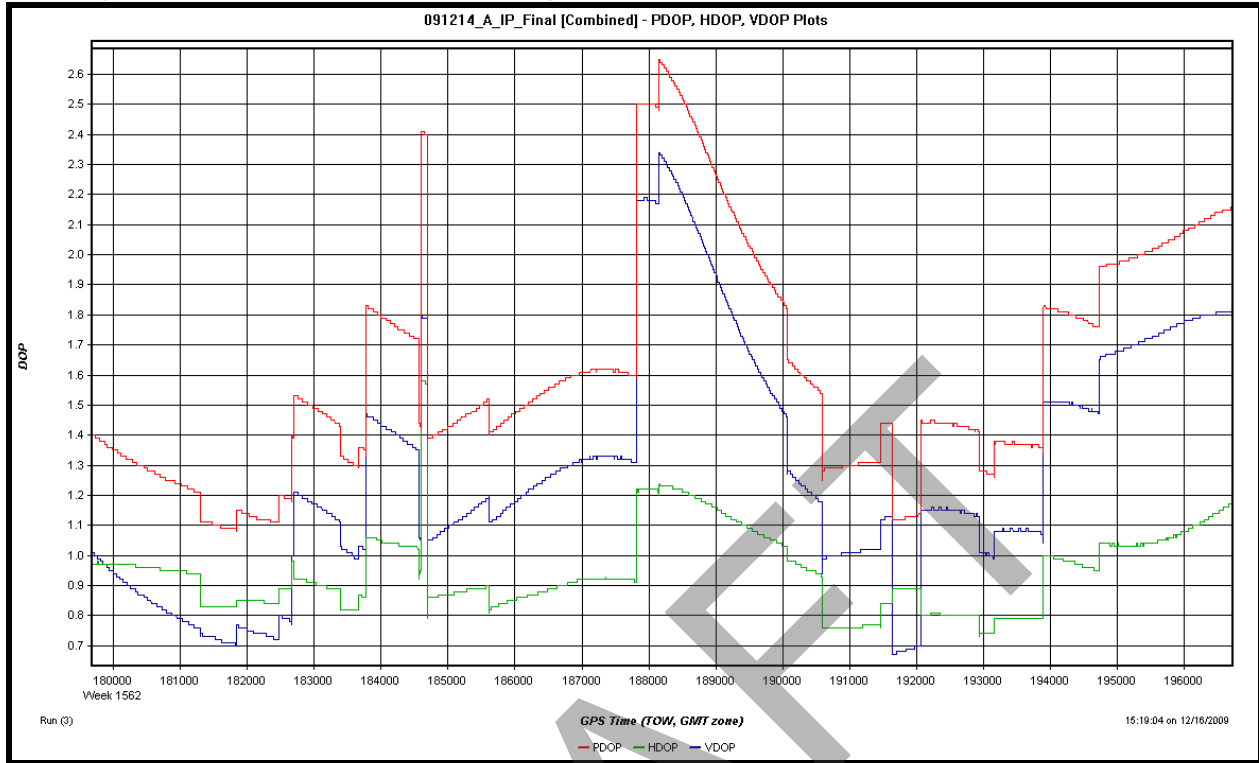


**PDOP (Positional Dilution Of Precision) Plot for mission 091213\_C**

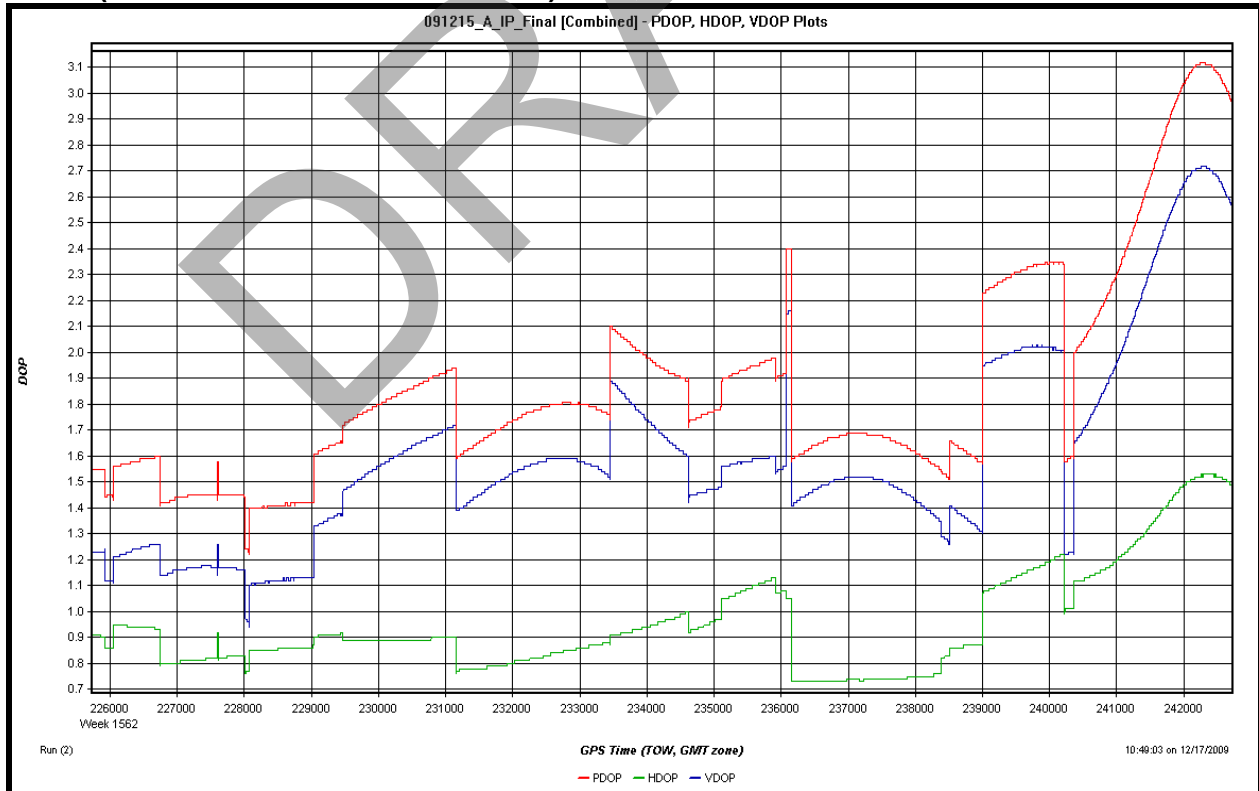


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 091214\_A

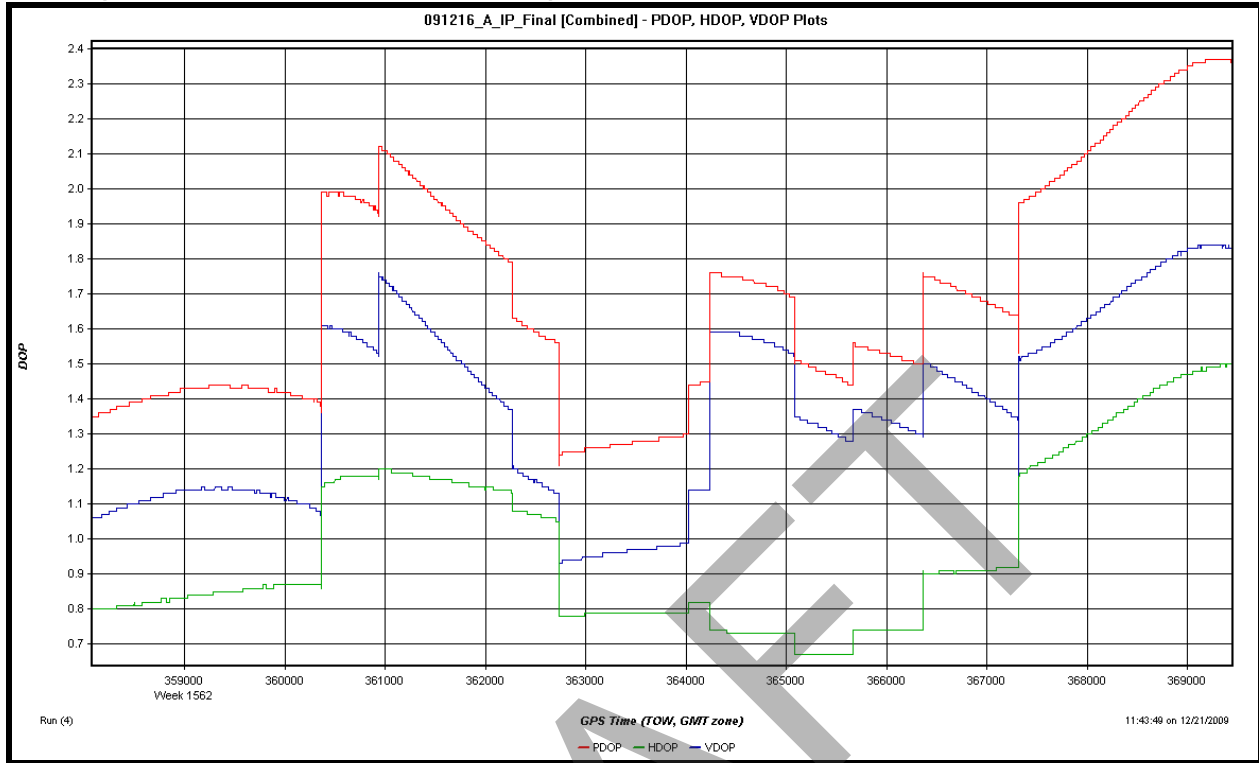


## PDOP (Positional Dilution Of Precision) Plot for mission 091215\_A

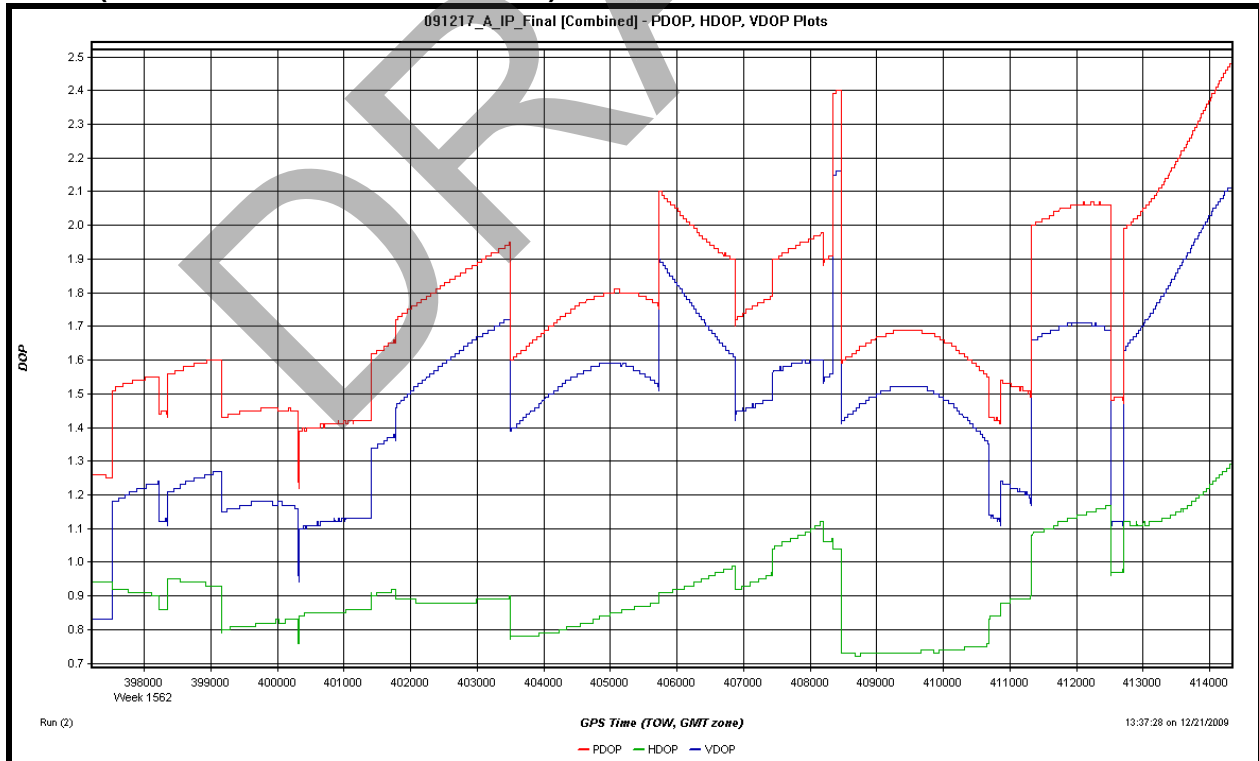


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 091216\_A

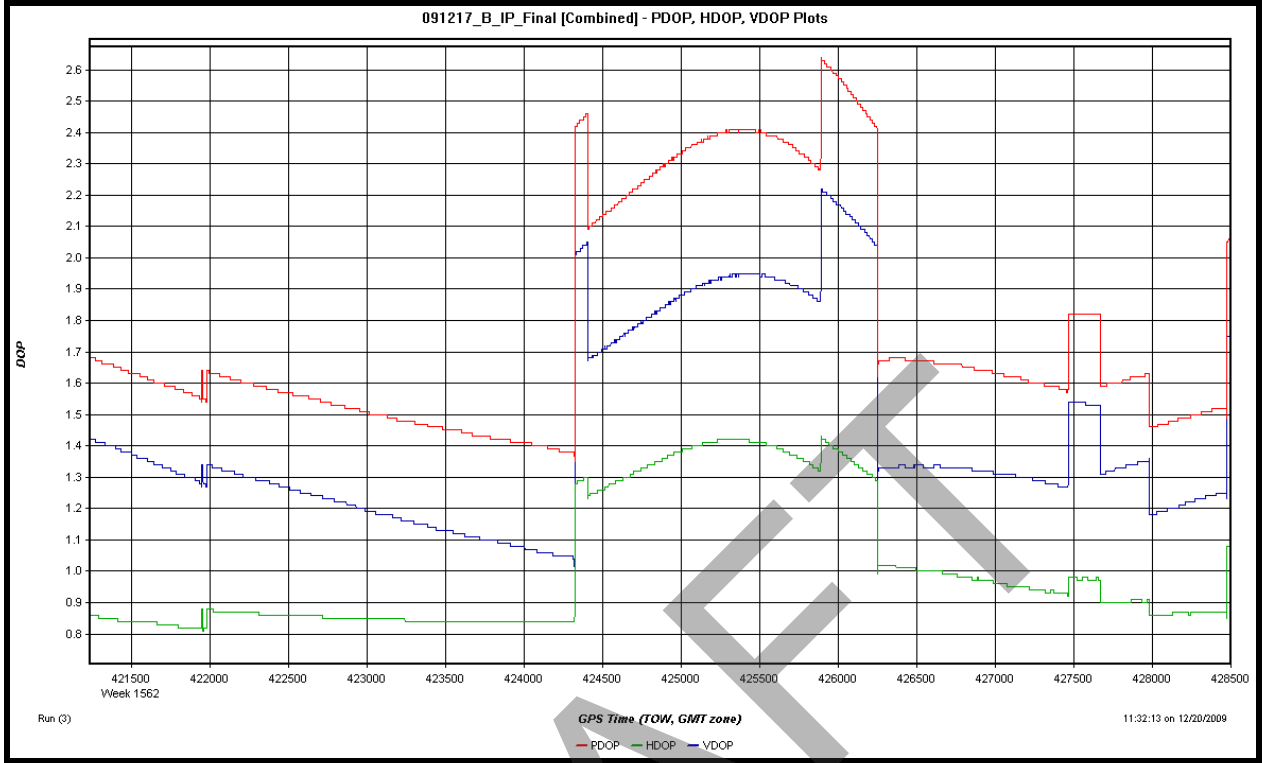


## PDOP (Positional Dilution Of Precision) Plot for mission 091217A\_A

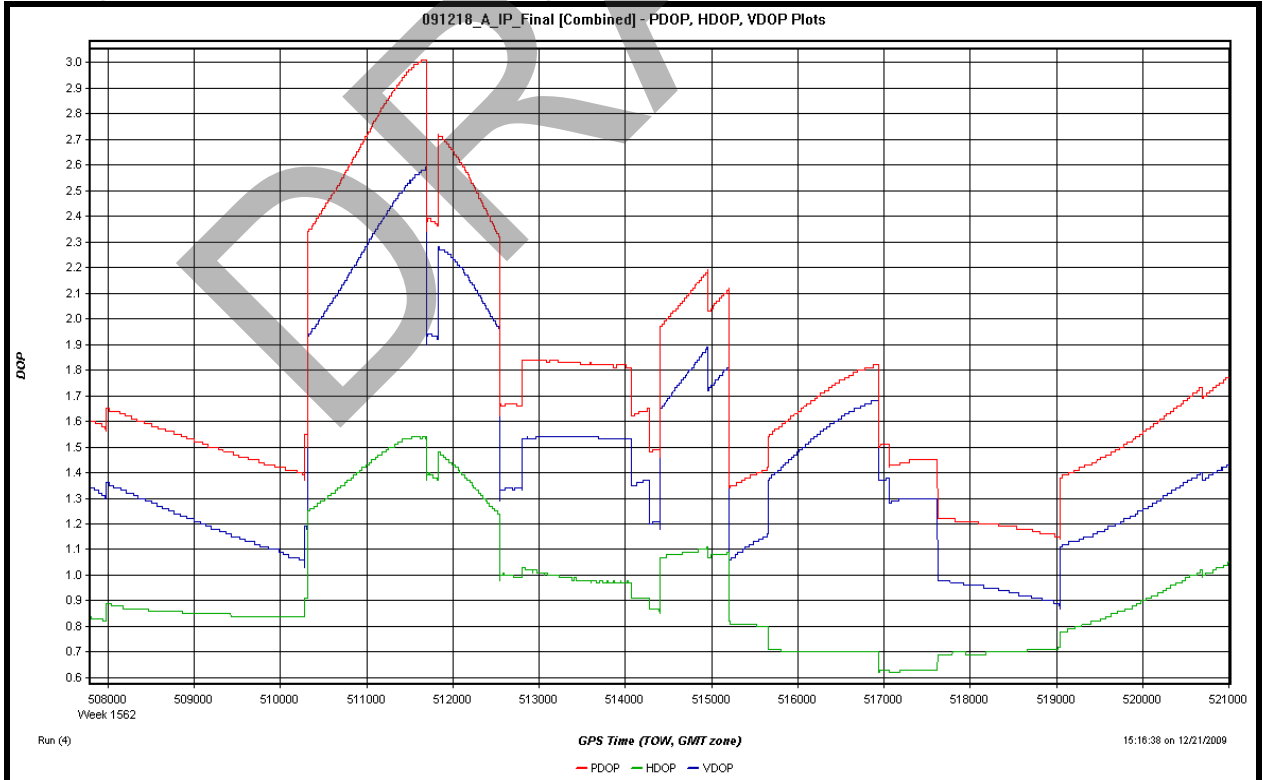


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 091217B\_A

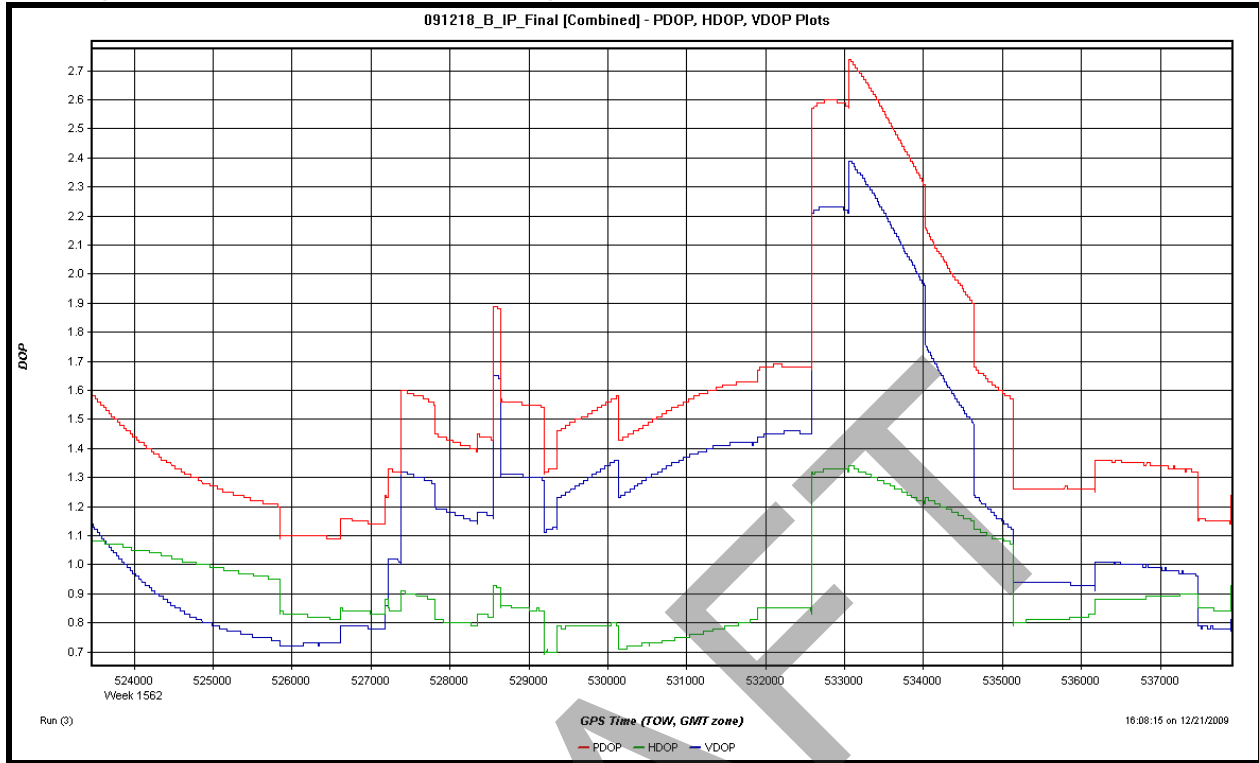


## PDOP (Positional Dilution Of Precision) Plot for mission 091218\_A

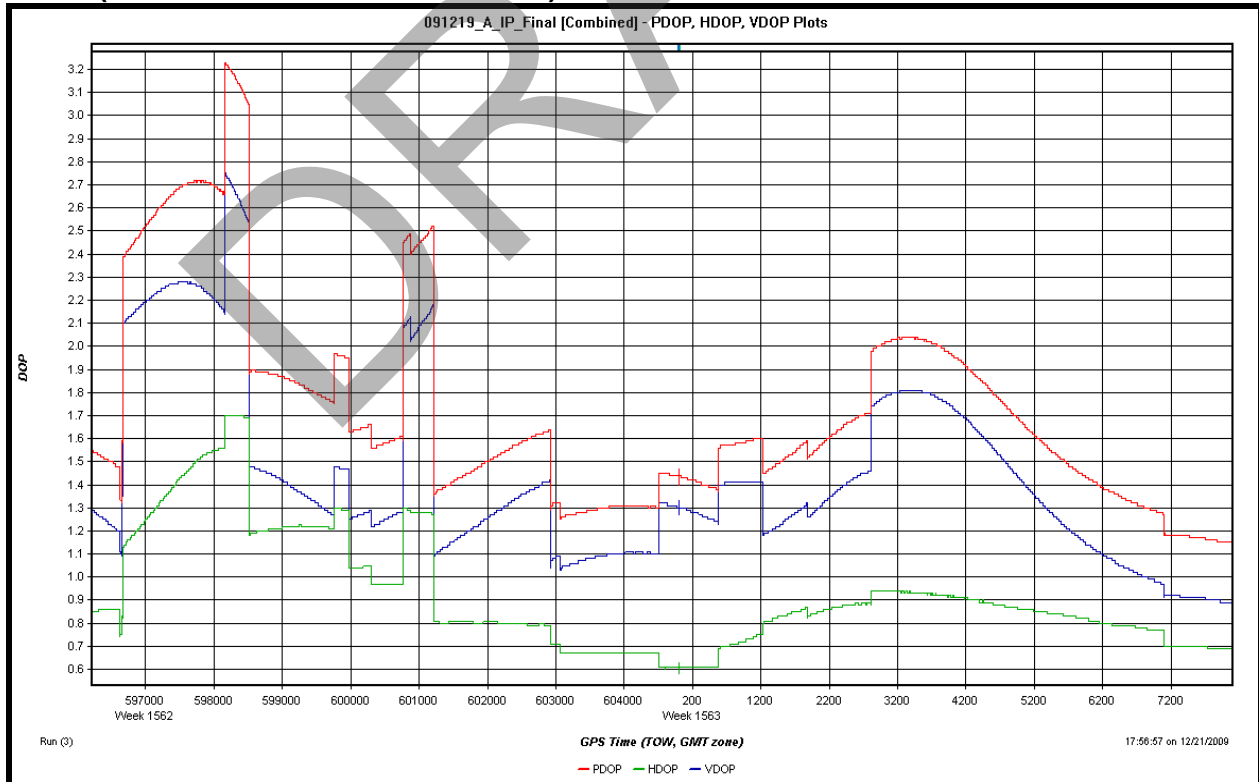


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 091218\_B

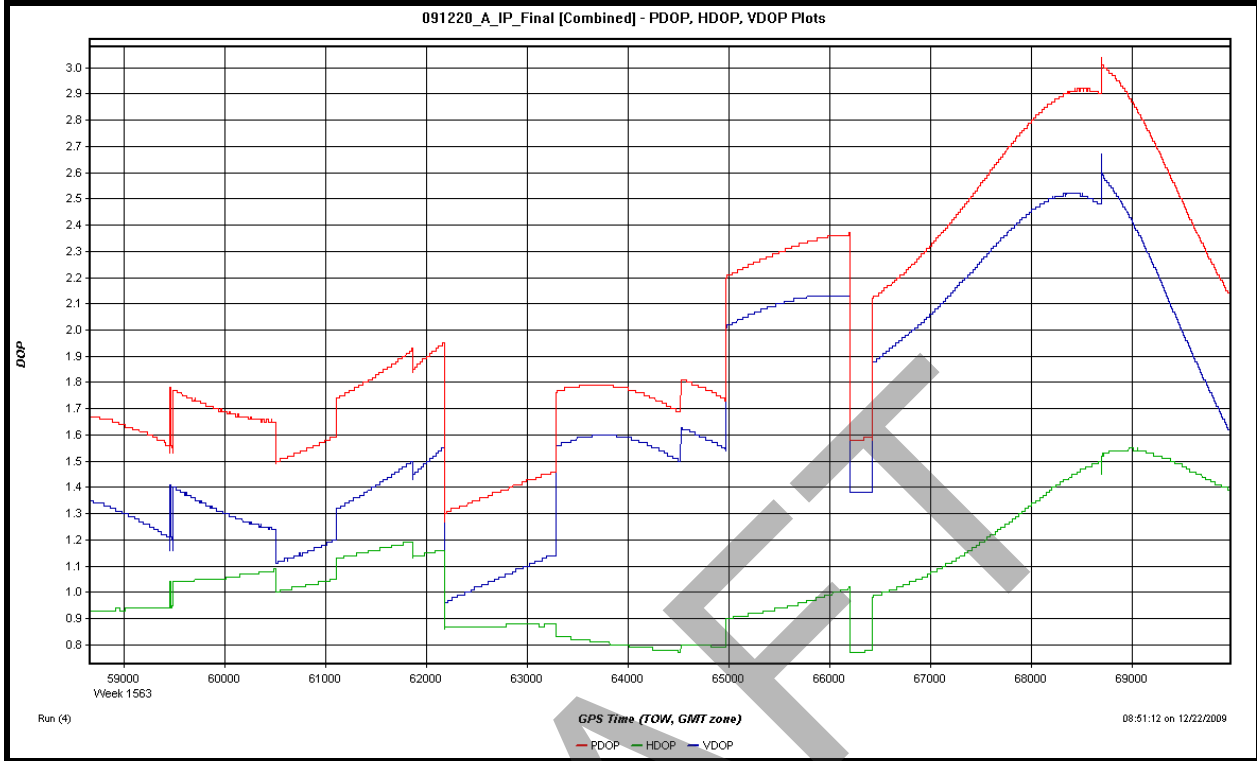


## PDOP (Positional Dilution Of Precision) Plot for mission 091219\_A

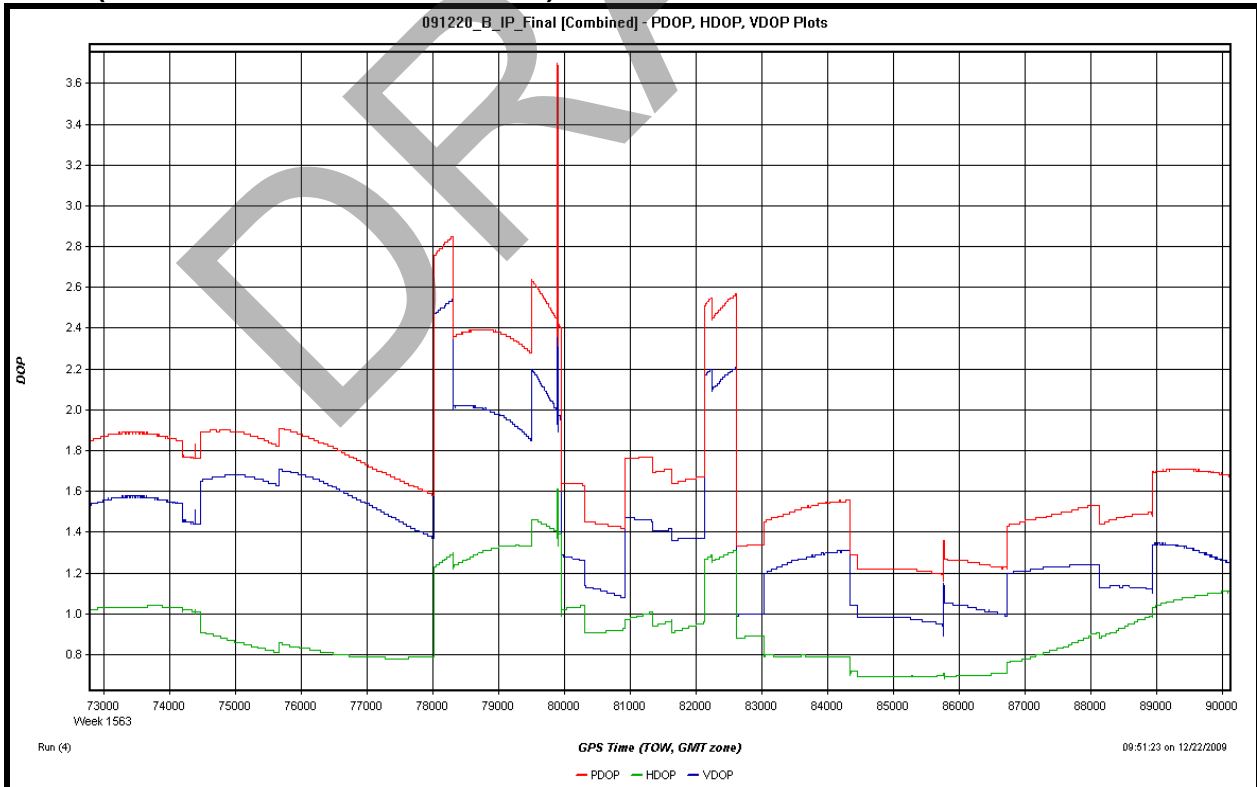


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 091220\_A



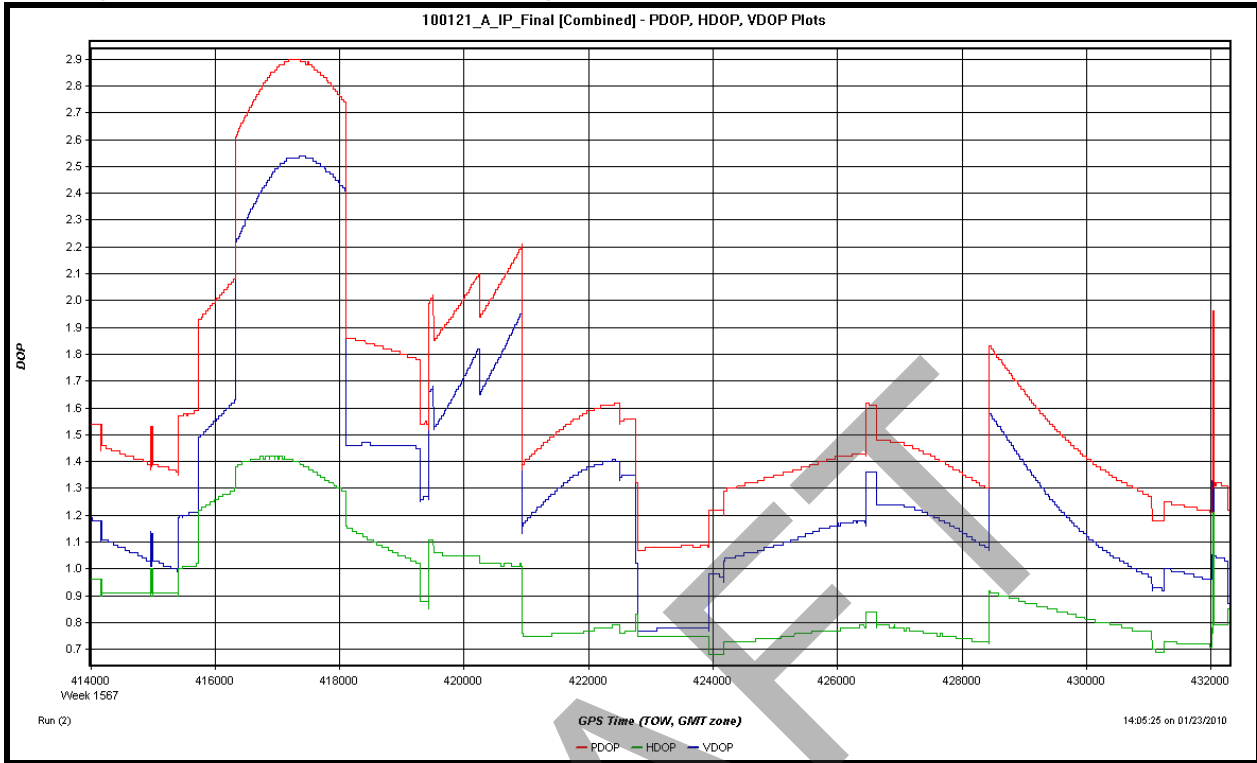
## PDOP (Positional Dilution Of Precision) Plot for mission 091220\_B



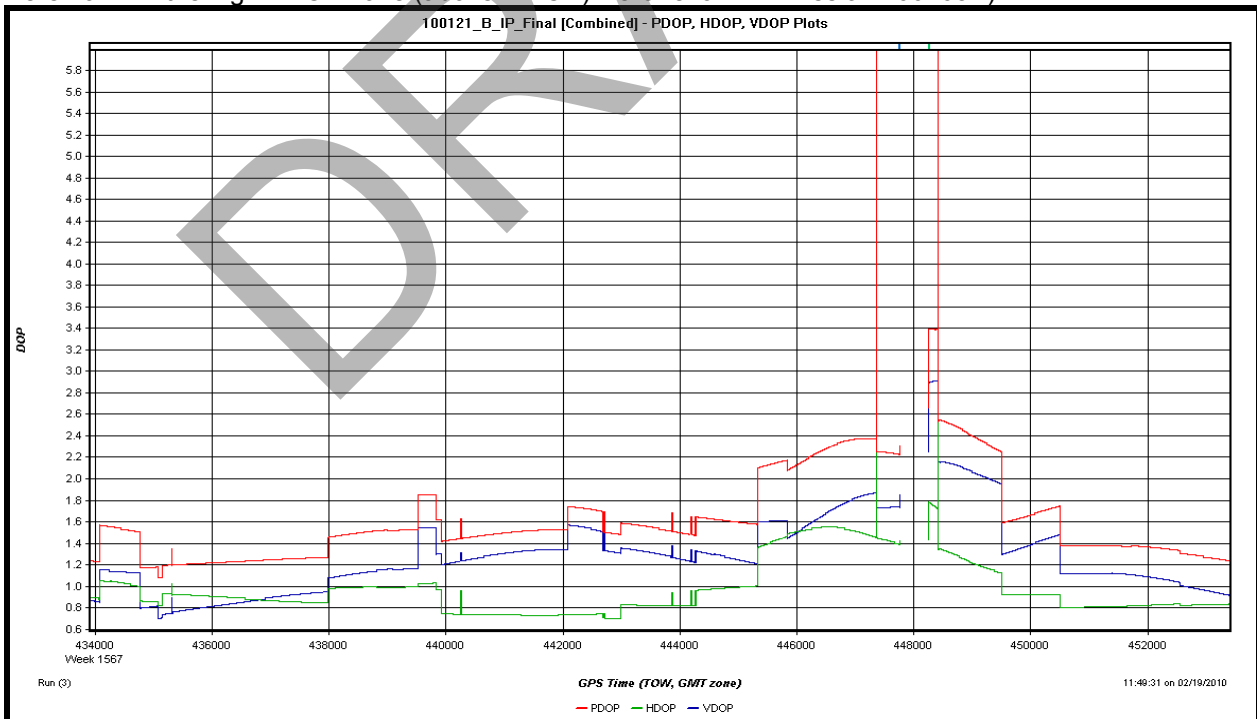


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 100121\_A

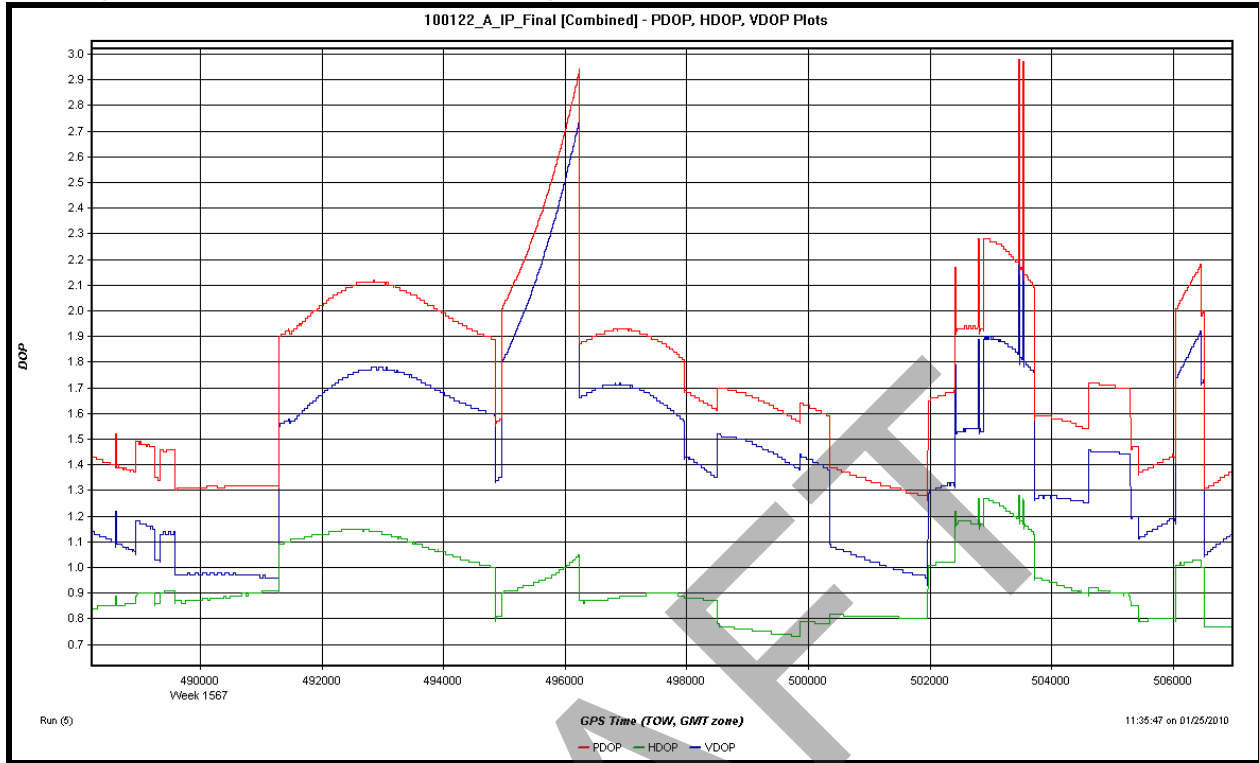


## PDOP (Positional Dilution Of Precision) Plot for mission 100121\_B (Note: Flight lines that were flown in the high PDOP zone (above 4 DOP) were reflight in mission 100205A)

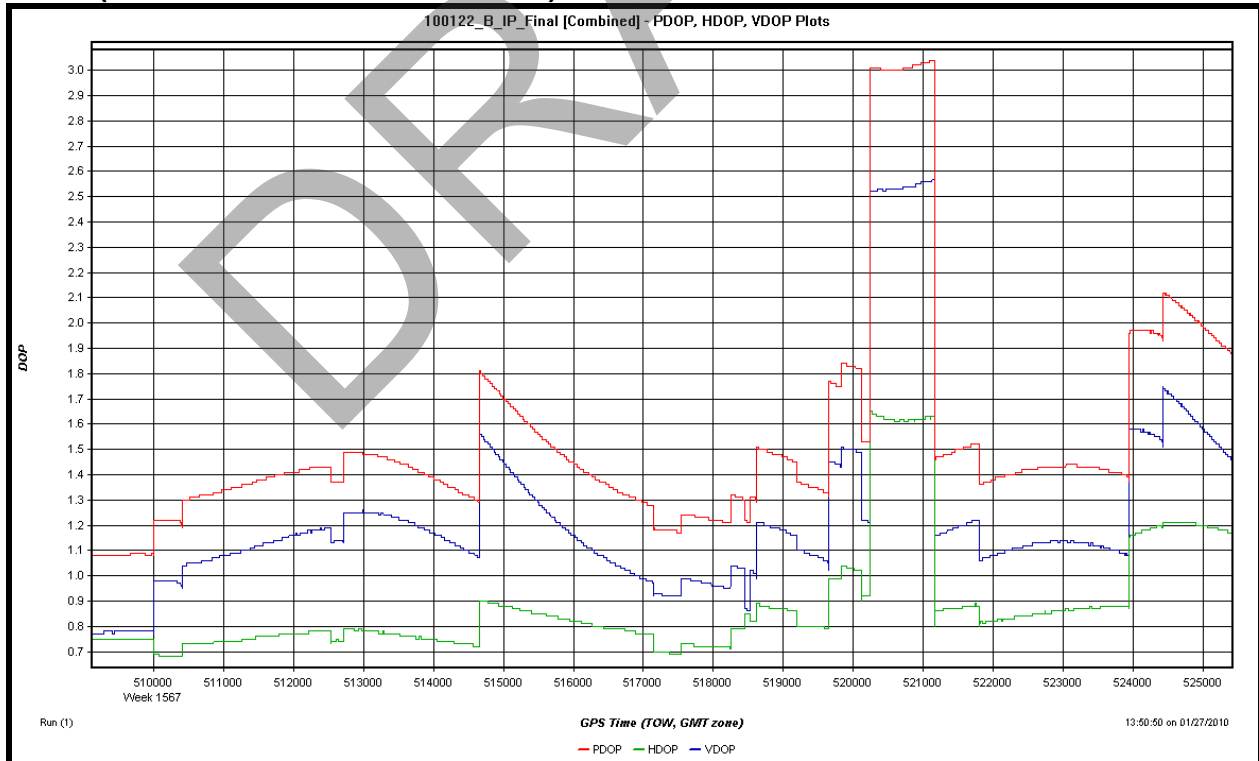


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 100122\_A

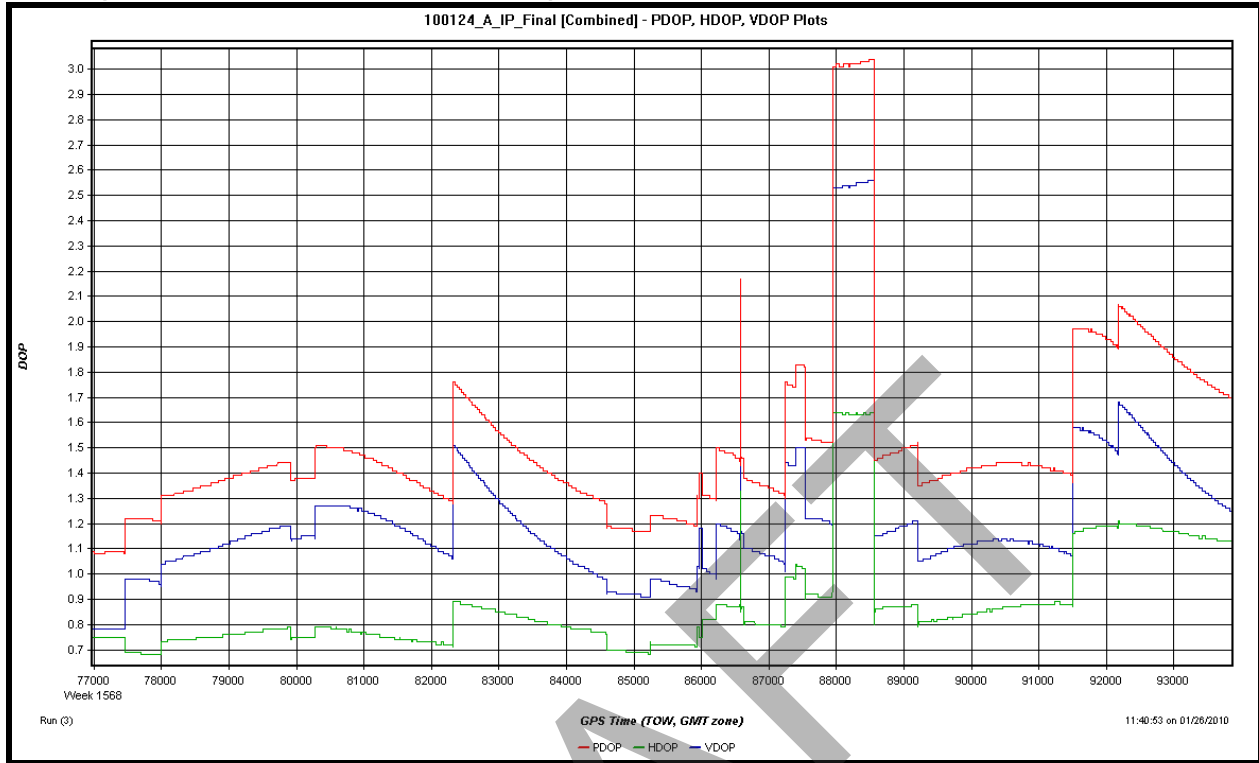


## PDOP (Positional Dilution Of Precision) Plot for mission 100122\_B

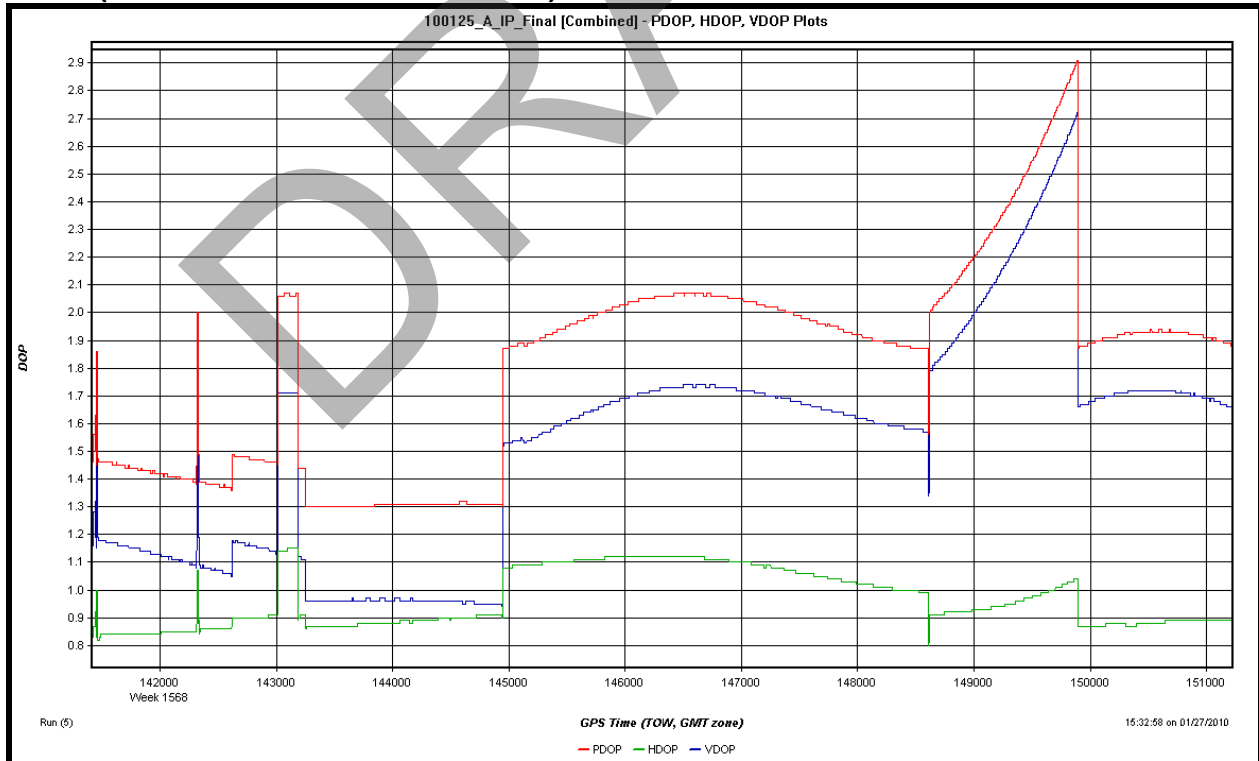


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 100124\_A

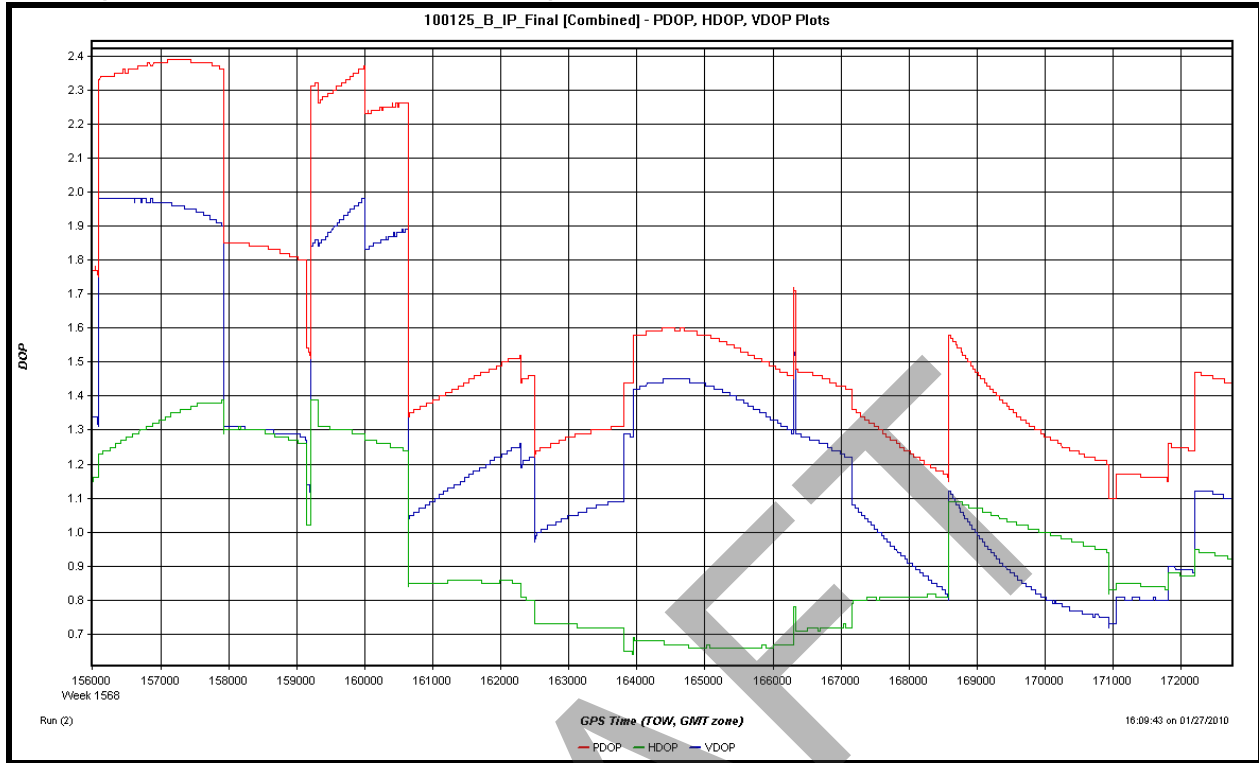


## PDOP (Positional Dilution Of Precision) Plot for mission 100125\_A

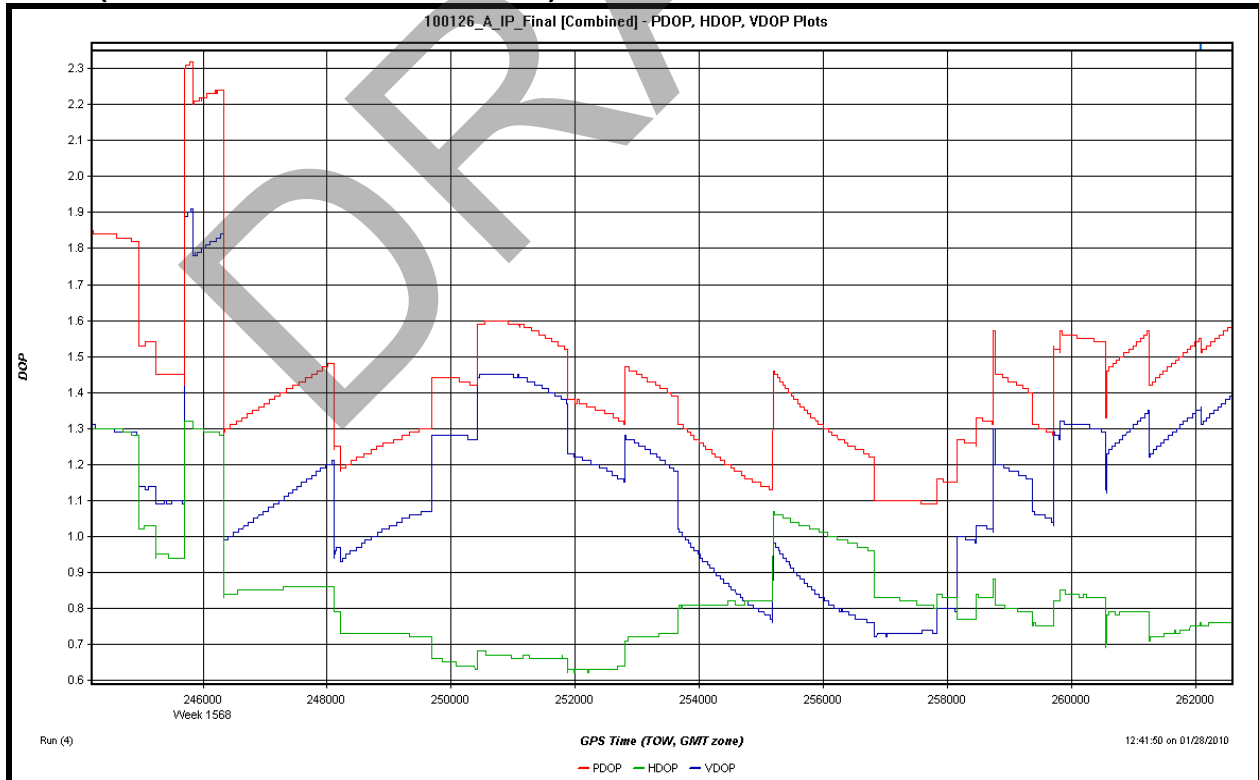


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 100125\_B

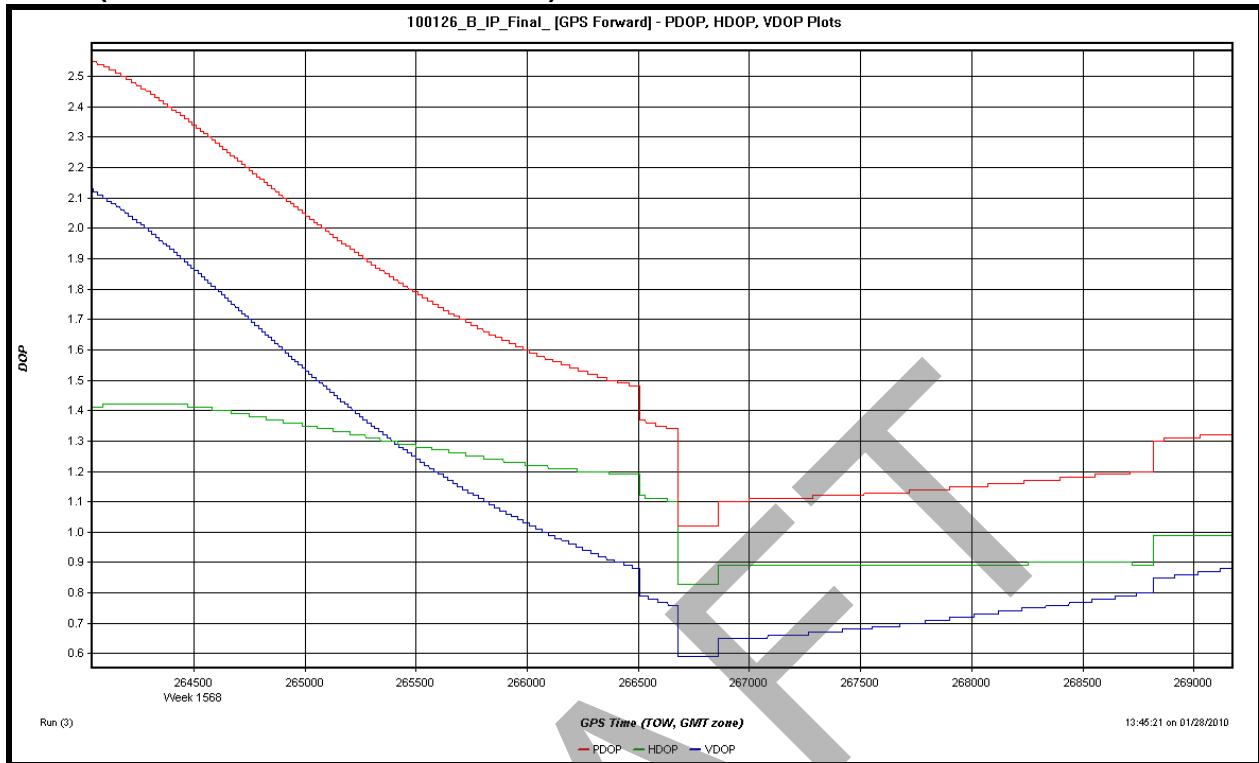


## PDOP (Positional Dilution Of Precision) Plot for mission 100126\_A

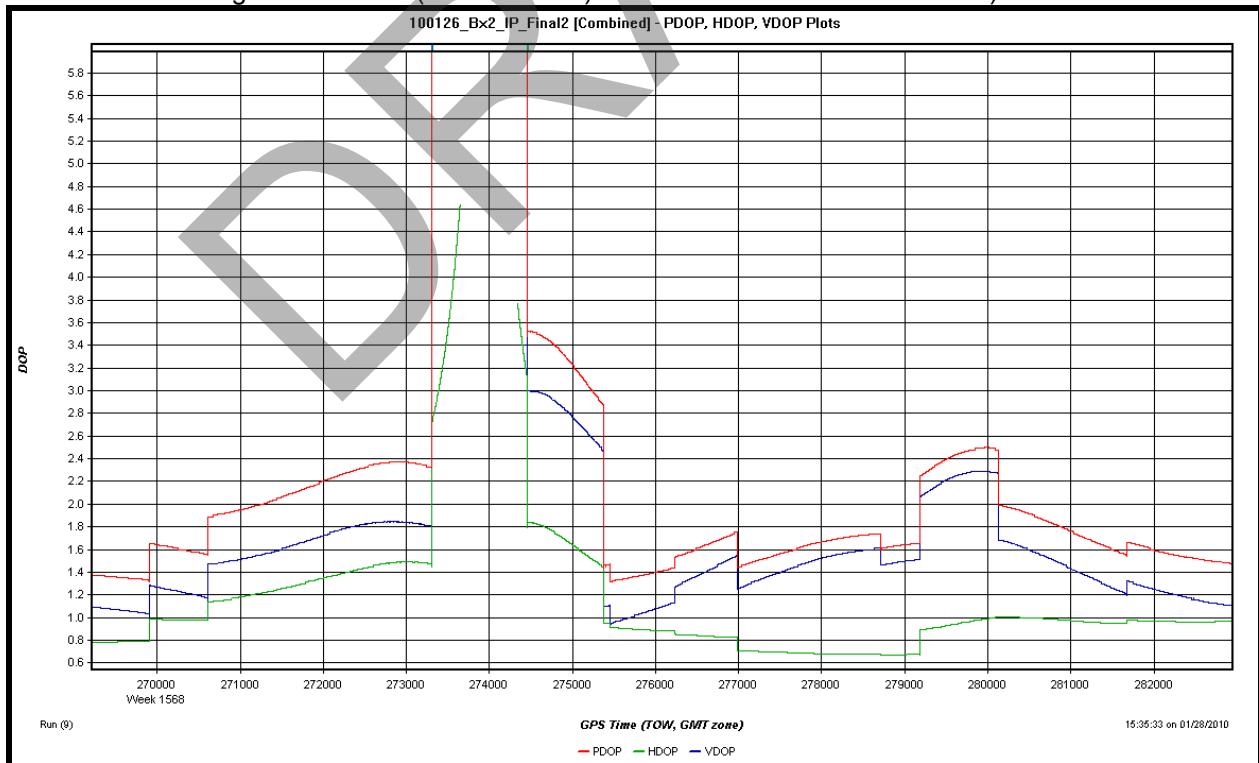


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 100126\_B

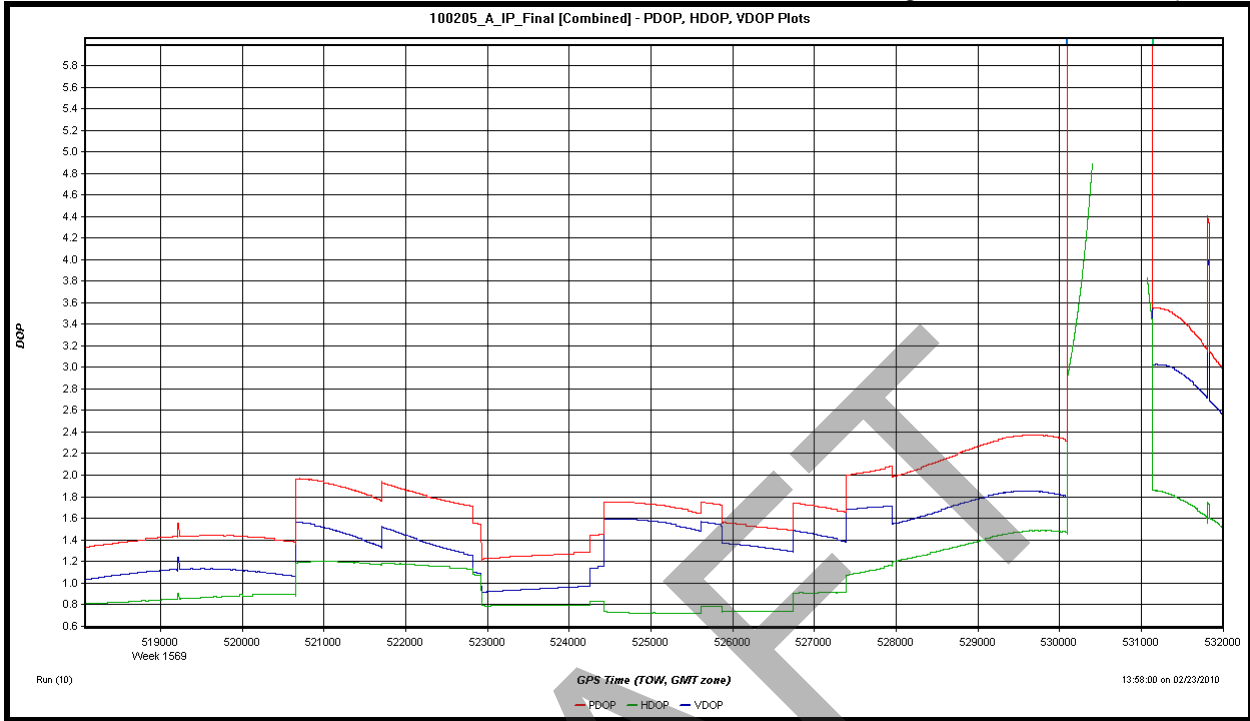


## PDOP (Positional Dilution Of Precision) Plot for mission 100126\_B2 (Note: Flight lines that were flown in the high PDOP zone (above 4 DOP) were reflown in mission 100205A)

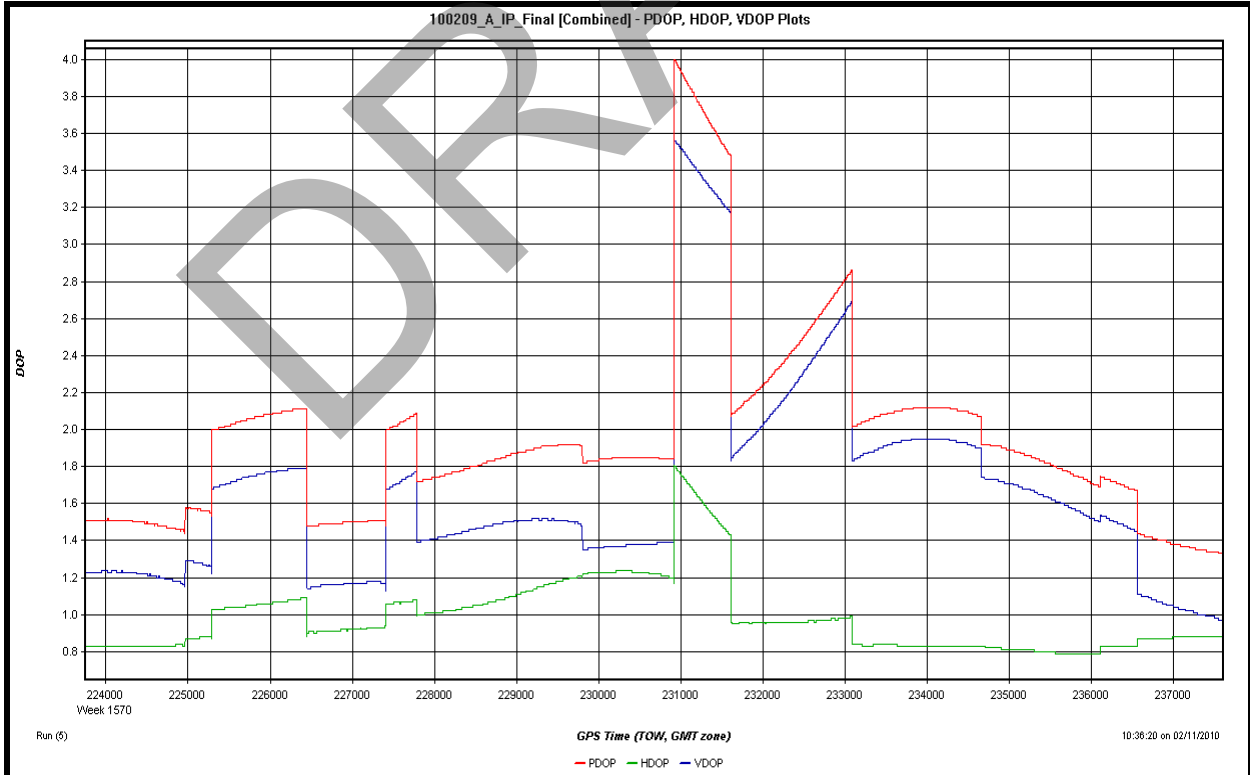


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

**PDOP (Positional Dilution Of Precision) Plot for mission 100205\_A** (Note: The PDOP shown that is above 4.0 PDOP is at the end of the mission and does not occur during a data collection time)

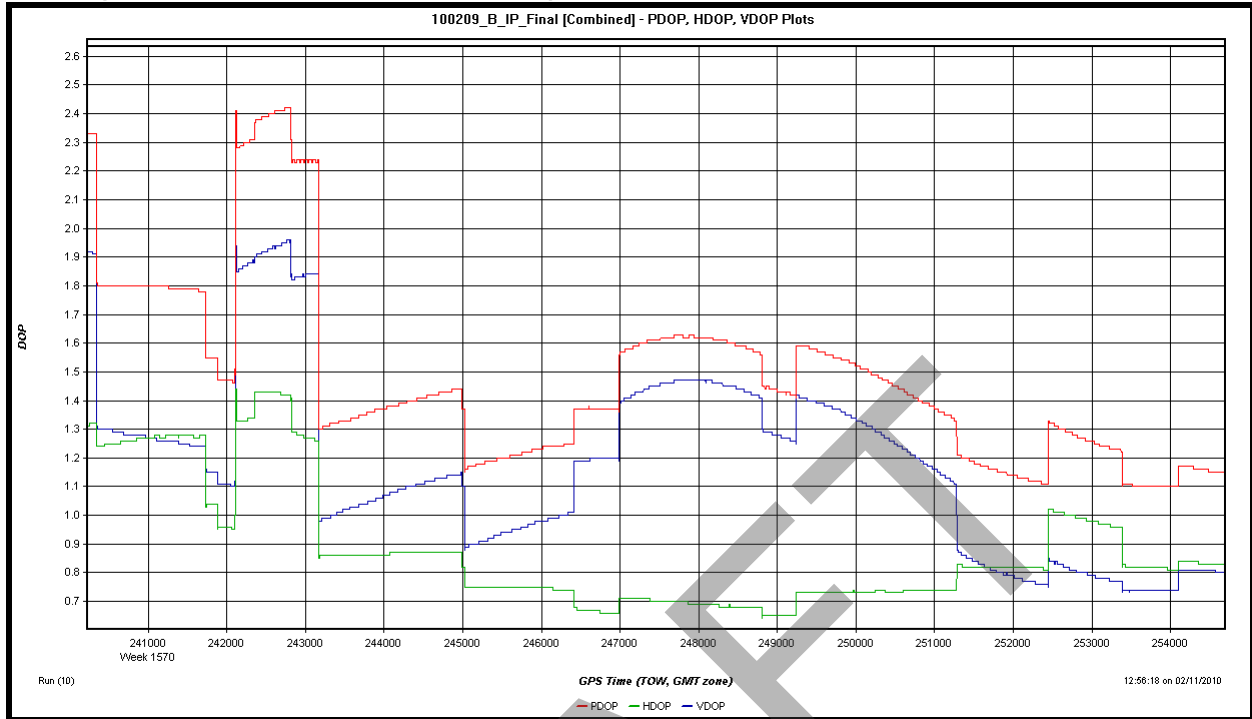


**PDOP (Positional Dilution Of Precision) Plot for mission 100209\_A**

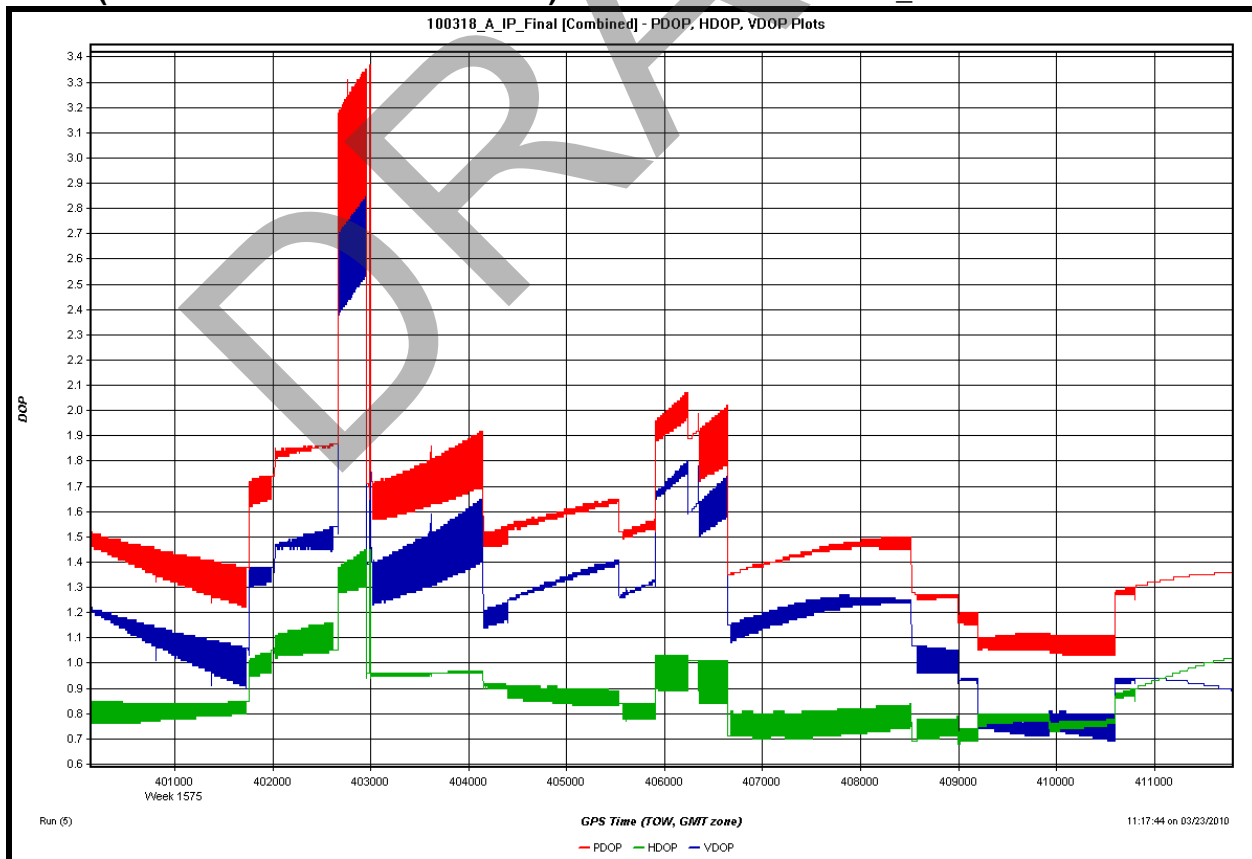


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 100209\_B

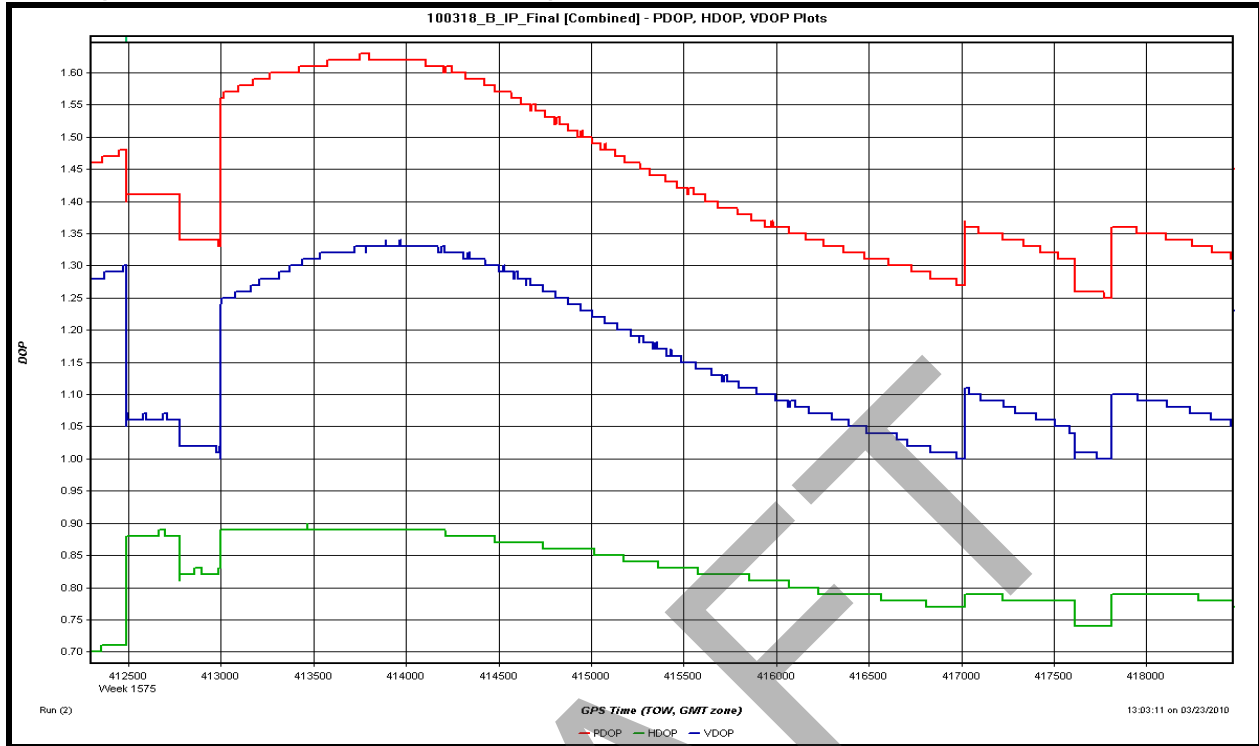


## PDOP (Positional Dilution Of Precision) Plot for mission 100318\_A

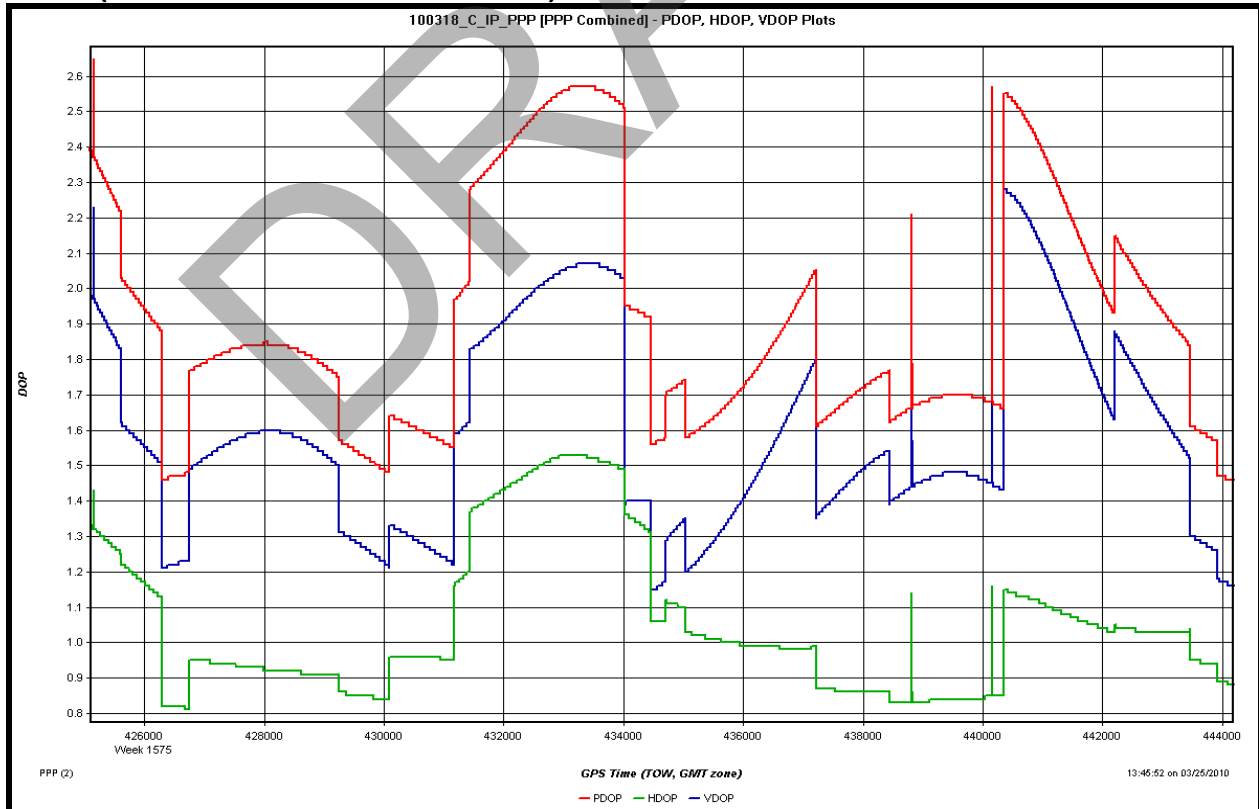


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 100318\_B



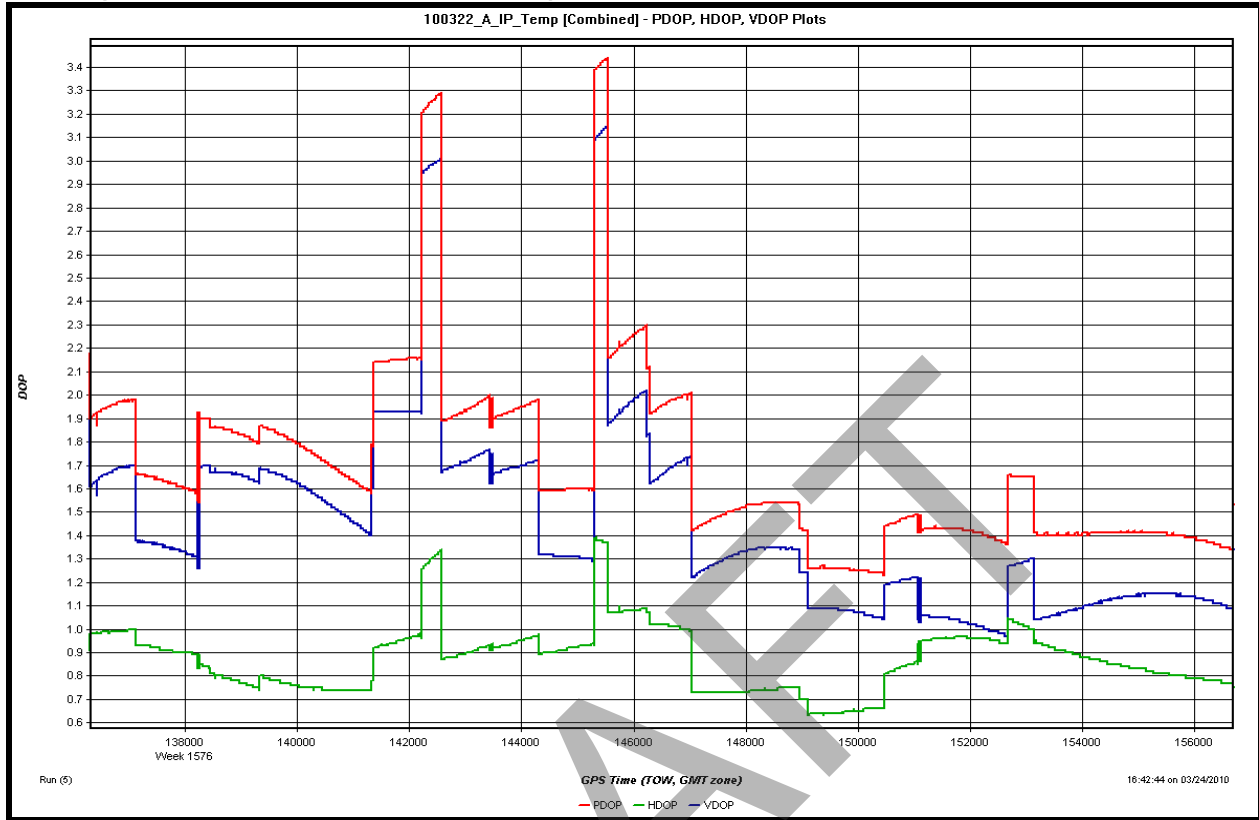
## PDOP (Positional Dilution Of Precision) Plot for mission 100318\_C



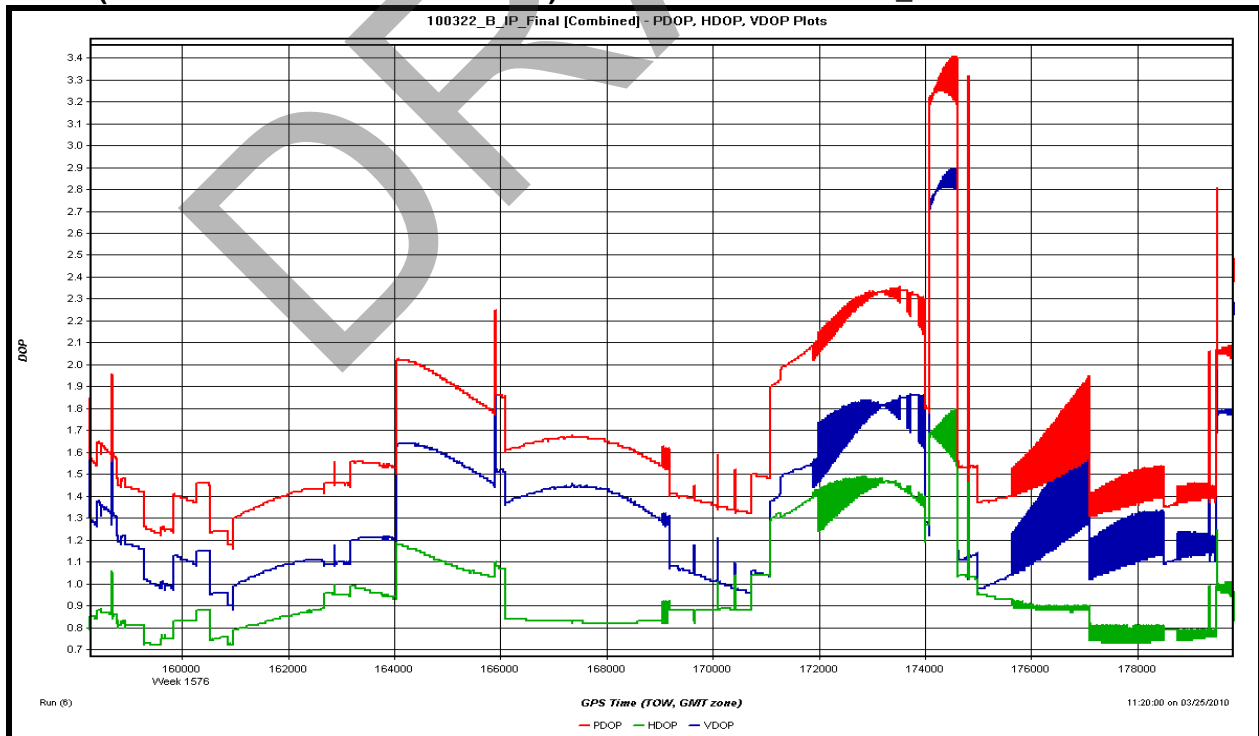


# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 100322\_A

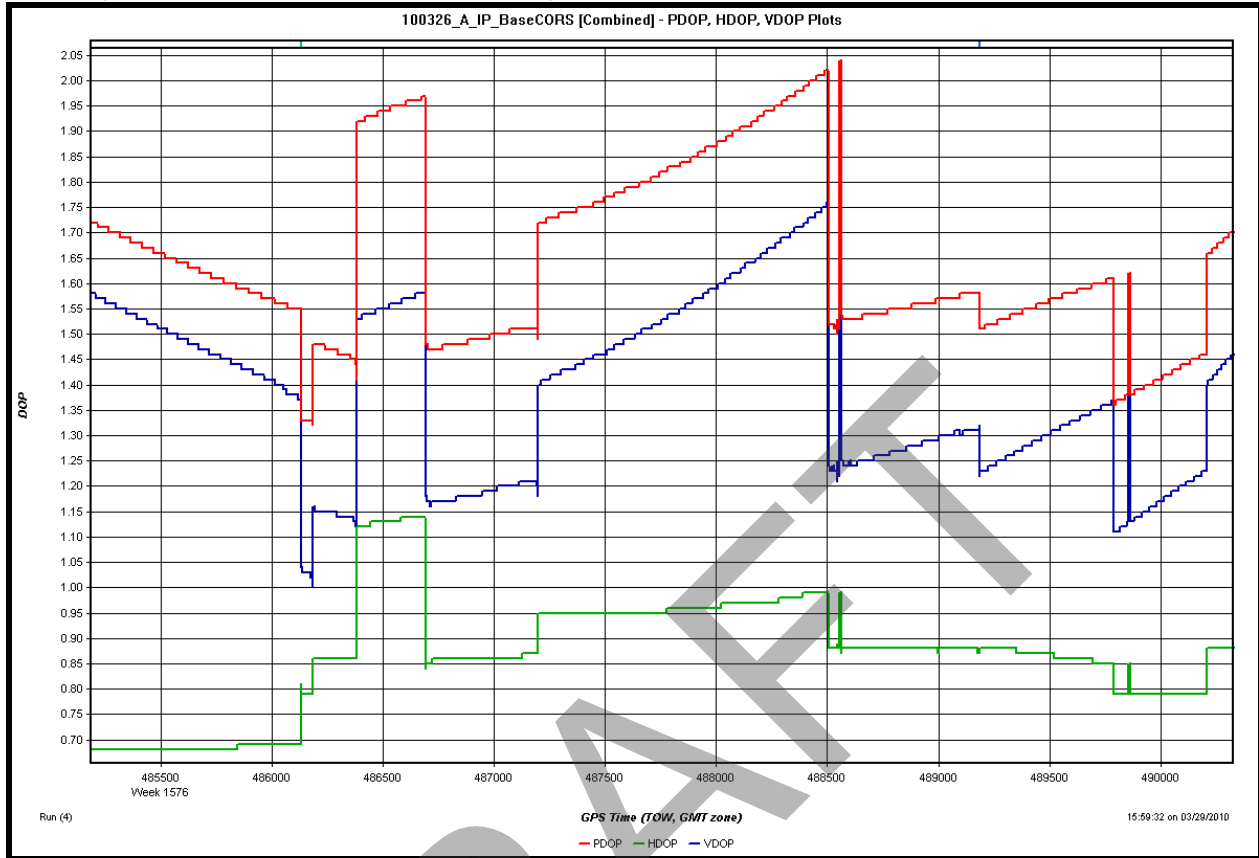


## PDOP (Positional Dilution Of Precision) Plot for mission 100322\_B



# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## PDOP (Positional Dilution Of Precision) Plot for mission 100326\_A



# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## **LiDAR Data Processing**

The airborne GPS data was post-processed using Leica IPAS Pro GNSS/INS Processor version 1.35. A fixed-bias carrier phase solution was computed in both the forward and reverse chronological directions. Whenever practical, LiDAR acquisition was limited to periods when the PDOP (Positional Dilution Of Precision) was less than 4.0. PDOP indicates satellite geometry relating to position. Generally PDOP's of 4.0 or less result in a good quality solution, however PDOP's between 4.0 and 5.0 can still yield good results most of the time. PDOP's over 6.0 are of questionable results and PDOP's of over 7.0 usually result in a poor solution. Usually as the number of satellites increase the PDOP decreases. Other quality control checks used for the GPS include analyzing the combined separation of the forward and reverse GPS processing from one base station and the results of the combined separation when processed from two different base stations. Basically this is the difference between the two trajectories. An analysis of the number of satellites, present during the flight and data collection times, is also performed.

The GPS trajectory was combined with the raw IMU data and post-processed using Leica IPAS Pro GNSS/INS Processor version 1.35. The smoothed best estimated trajectory (SBET) and refined attitude data are then utilized in the ALS Post Processor to compute the laser point-positions – the trajectory is combined with the attitude data and laser range measurements to produce the 3-dimensional coordinates of the mass points. Up to four return values are produced within the ALS Post Processor software for each pulse which ensures the greatest chance of ground returns in a heavily forested area.

Laser point classification was completed using Merrick Advanced Remote Sensing (MARS®) LiDAR processing and modeling software. Several algorithms are used when comparing points to determine the best automatic ground solution. Each filter is built based on the projects terrain and land cover to provide a surface that is 90% free of anomalies and artifacts. After the auto filter has been completed the data sets are then reviewed by an operator utilizing MARS® to remove any other anomalies or artifacts not resolved by the automated filter process. During these final steps the operator also verifies that the datasets are consistent and complete with no data voids.

## **GPS Controls**

Multiple ground GPS Base Stations, for the LiDAR data collection, were set up every mission. One GPS ground base station was always set up at the airport of operation and multiple base stations were placed under or close to the flight lines for that day's mission. Trimble GPS receivers were used for the Base Stations and tied directly to each other by post processing using Trimble Geomatics Office Software version 1.63 and checked with OPUS solutions from NGS (National Geodetic Survey). All ground GPS Base Stations were open to the sky with no obstructions.

See Spreadsheet Below for Airborne GPS Base Station information.

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

**Project: Oklahoma NRCS LiDAR Mapping**

**Job#: 02016426**

**Date: Dec. 2009**

**Coordinate System: UTM 14&15**

**Zone: 14 &15 North**

**Horizontal Datum: NAD83**

**Vertical Datum(Geoid): NAVD88 Geoid03**

**Units: Meters**

Pt#	Geodetic NAD83		Ellipsoid	UTM14N		NAVD88	Description
Name	Latitude	Longitude	Height	Northing	Easting	Elevation	
	North	West	Geoid03	Y	X	Z	
	Deg Min Sec	Deg Min Sec	Meters	Meters	Meters	Meters	
Base_ElkCity	35°25'31.59552"N	99°23'41.49186"W	575.140	3920296.350	464155.872	602.358	Base_ElkCity
Aux_ElkCity	35°25'33.53185"N	99°23'41.39740"W	575.393	3920355.994	464158.492	602.612	Aux_ElkCity
Base_101	35°36'34.18829"N	99°42'02.39738"W	593.032	3940863.281	436540.274	620.797	Base_101
Base_Hobart	34°59'29.86155"N	99°03'21.48052"W	447.488	3872116.096	494892.416	473.204	Base_Hobart
Aux_Hobart	34°59'31.68413"N	99°03'21.48971"W	447.603	3872172.239	494892.214	473.320	Aux_Hobart
CORS_OKAO	35°04'35.04540"N	98°14'45.20196"W	340.543	3881775.764	568750.493	367.311	CORS_OKAO
Base_Chick	35°05'27.49915"N	97°57'57.82219"W	319.228	3883620.472	594245.788	345.859	Base_Chickasha
Aux_Chick	35°05'26.14668"N	97°57'56.31258"W	319.213	3883579.203	594284.445	345.843	Aux_Chickasha
Base_Ard	34°18'02.06418"N	97°01'41.26421"W	195.674	3797243.914	681467.312	221.331	Base_Ardmore
Aux_Ard	34°18'00.85895"N	97°01'41.87444"W	195.431	3797206.481	681452.430	221.090	Aux_Ardmore
Base_PaulsV	34°42'21.88899"N	97°13'17.14075"W	265.589	3841888.984	662885.117	291.080	Base_PaulsValley
Base_Bro	34°25'05.05492"N	96°29'35.23760"W	188.719	3811362.355	730391.239	214.957	Base_Bromide
Base_Still	36°09'29.83648"N	97°04'58.79974"W	263.623	4003207.535	672438.592	291.832	Base_Stillwater
Base_B195	35°30'12.20852"N	96°52'43.81844"W	265.929	3930938.229	692381.055	293.496	Base_B195
Pt#	Geodetic NAD83		Ellipsoid	UTM15N		NAVD88	Description
Name	Latitude	Longitude	Height	Northing	Easting	Elevation	
	North	West	Geoid03	Y	X	Z	
	Deg Min Sec	Deg Min Sec	Meters	Meters	Meters	Meters	
Base_663A	34°45'13.06025"N	95°03'17.08388"W	178.269	3847644.778	311926.58	210.002	Base_663A
Base_Sallisaw	35°22'01.46066"N	94°48'59.70995"W	130.946	3915265.824	334967.99	161.276	Base_Sallisaw

# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## Ground Control Parameters

**Horizontal Datum:** The horizontal datum for the project is North American Datum of 1983 (NAD83).

**Coordinate System:** Universal Transverse Mercator (UTM), Zone 14 North and Zone 15 North.

**Vertical Datum:** The Vertical datum for the project is North American Vertical Datum of 1988 (NAVD88).

**Units:** Horizontal units are in Meters, Vertical units are in Meters.

## GROUND CONTROL REPORT / CHECK POINT SURVEY RESULTS

### Ground Survey Control Report

The following listing shows the newly established GPS ground control, collected for LiDAR check points. The new ground control points (checkpoints) were established and surveyed by AMEC Earth & Environmental, Inc. Surveyors.

#### Ground Control Coordinates Main Area UTM Zone 14

#### Ground Proof Coordinates Main Area UTM Zone 14

**Project Name:** NRCS Oklahoma

**AMEC Project #:** 09-117-70105

**Coordinate System:** UTM Zone 14

**UNITS:** Meters

**Horizontal Datum:** NAD83

**Vertical Datum:** NAVD88

**ELEV\*:** REPORTED TO NEAREST 0.05m

Name	EastM_UTM14_NAD83	NorthM_UTM14_NAD83	ElevM_NAVD88	Submittal Desc.
2028	676129.96	3809438.23	243.50	GROUND PROOF 553
3000	421015.73	3947004.64	673.80	GROUND PROOF 18
3001	421067.09	3950709.34	696.35	GROUND PROOF 17
3002	422375.22	3955033.96	657.65	GROUND PROOF 16
3003	416280.67	3954782.47	721.50	GROUND PROOF 8
3004	415453.88	3949159.74	754.80	GROUND PROOF 9
3005	416152.45	3943533.33	729.90	GROUND PROOF 10
3006	409714.89	3943733.20	752.30	GROUND PROOF 2
3010	409814.43	3954883.13	712.50	GROUND PROOF 4
3011	409899.74	3960500.60	711.20	GROUND PROOF 5
3012	414784.59	3965234.82	739.50	GROUND PROOF 6
3013	419655.38	3969985.36	756.80	GROUND PROOF 13
3014	419627.60	3964364.47	724.55	GROUND PROOF 14
3015	421211.04	3960298.01	712.10	GROUND PROOF 15
3017	425325.19	3950634.77	633.95	GROUND PROOF 27

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3020	426829.42	3960220.77	714.40	GROUND PROOF 29
3022	428629.63	3951610.87	627.90	GROUND PROOF 33
3023	434526.42	3950123.93	686.80	GROUND PROOF 34
3024	432404.07	3955381.94	696.20	GROUND PROOF 32
3025	432458.42	3961792.69	715.00	GROUND PROOF 31A
3028	409635.74	3937978.45	777.10	GROUND PROOF 1
3029	417405.09	3933143.18	760.30	GROUND PROOF 12
3030	420545.96	3929875.35	755.55	GROUND PROOF 22
3031	422983.15	3933059.84	757.55	GROUND PROOF 21
3032	421434.26	3937851.34	711.60	GROUND PROOF 20
3034	438988.02	3932887.73	686.55	GROUND PROOF 42
3036	438115.77	3924035.00	683.35	GROUND PROOF 40
3037	444234.11	3926078.45	618.65	GROUND PROOF 56
3038	444359.95	3930851.53	641.20	GROUND PROOF 55
3039	444788.43	3937479.56	603.35	GROUND PROOF 54
3041	438631.19	3939280.00	603.40	GROUND PROOF 43
3042	439433.59	3943304.14	587.60	GROUND PROOF 53
3043	440288.91	3945709.92	588.50	GROUND PROOF 51
3044	443478.95	3945678.74	608.15	GROUND PROOF 50
3045	439771.50	3947958.56	597.50	GROUND PROOF 45
3047	431038.60	3940975.13	631.45	GROUND PROOF 36
3048	427035.63	3937791.52	701.85	GROUND PROOF 24
3049	428587.96	3933012.09	739.15	GROUND PROOF 23
3050	433367.58	3932581.09	709.35	GROUND PROOF 38
3051	433330.45	3926903.56	730.30	GROUND PROOF 39
3054	444454.34	3952491.57	603.10	GROUND PROOF 62
3055	443625.96	3955855.40	632.50	GROUND PROOF 49
3058	448488.94	3965992.70	670.30	GROUND PROOF 65
3059	454844.10	3966435.05	609.95	GROUND PROOF 67
3060	454899.22	3971235.73	670.00	GROUND PROOF 66
3061	455012.18	3961647.09	589.05	GROUND PROOF 68
3062	454770.94	3956856.14	619.15	GROUND PROOF 69
3063	450065.79	3953685.54	634.45	GROUND PROOF 63
3064	448332.14	3947699.88	597.05	GROUND PROOF 61
3066	456358.16	3945617.93	560.80	GROUND PROOF 71
3068	454063.40	3935962.19	567.70	GROUND PROOF 73
3069	454365.99	3929920.76	612.30	GROUND PROOF 74
3070	449364.18	3928917.04	587.30	GROUND PROOF 58
3073	448911.14	3942433.20	577.50	GROUND PROOF 60
3075	467828.54	3945547.99	525.70	GROUND PROOF 89

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3076	473913.09	3946321.86	516.90	GROUND PROOF 103
3078	473183.76	3957722.53	559.95	GROUND PROOF 105
3079	471609.39	3963165.01	609.10	GROUND PROOF 106
3081	467628.26	3968012.84	619.95	GROUND PROOF 85
3082	467305.42	3973335.61	671.55	GROUND PROOF 84
3084	460423.17	3962299.02	612.85	GROUND PROOF 82
3085	466040.78	3962333.99	594.40	GROUND PROOF 86
3086	467324.00	3956789.50	539.75	GROUND PROOF 87
3087	467579.79	3951490.45	525.35	GROUND PROOF 88
3089	461125.01	3951209.11	586.90	GROUND PROOF 80
3091	467443.32	3939906.79	568.25	GROUND PROOF 90
3092	461017.55	3938818.71	542.10	GROUND PROOF 78
3093	474927.25	3914254.73	603.50	GROUND PROOF 119
3094	480436.99	3915035.78	582.00	GROUND PROOF 120
3095	482953.09	3920606.36	530.25	GROUND PROOF 121
3096	484586.97	3926266.72	529.55	GROUND PROOF 122
3098	476268.51	3935876.75	528.00	GROUND PROOF 101
3099	470692.75	3935883.07	554.90	GROUND PROOF 100
3101	459364.43	3932792.92	584.65	GROUND PROOF 77
3103	455739.70	3923160.93	672.30	GROUND PROOF 75
3104	461369.80	3923144.42	604.75	GROUND PROOF 93
3106	463762.80	3929551.98	621.90	GROUND PROOF 92
3107	468547.07	3931150.60	579.65	GROUND PROOF 99
3108	473361.13	3930606.25	579.95	GROUND PROOF 98
3109	478139.03	3925471.58	547.75	GROUND PROOF 117
3111	472557.73	3924694.36	572.65	GROUND PROOF 97
3112	471727.28	3919003.36	591.85	GROUND PROOF 96
3113	466926.28	3919085.14	607.00	GROUND PROOF 95
3114	497994.52	3965331.12	550.95	GROUND PROOF 180
3115	490790.90	3966367.23	602.25	GROUND PROOF 136
3116	485231.50	3966370.91	593.25	GROUND PROOF 135
3117	479282.58	3968010.50	594.75	GROUND PROOF 108
3118	477198.09	3962971.20	562.30	GROUND PROOF 109
3119	481994.59	3961574.93	551.00	GROUND PROOF 134
3121	493208.80	3961542.34	566.80	GROUND PROOF 138
3122	498358.28	3959922.52	568.40	GROUND PROOF 179
3123	500164.49	3955094.58	563.60	GROUND PROOF 178
3125	489996.20	3956734.59	558.95	GROUND PROOF 139
3126	484528.77	3956729.61	545.45	GROUND PROOF 133
3127	478772.16	3957602.27	578.00	GROUND PROOF 110

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3128	479545.20	3951937.32	563.10	GROUND PROOF 111
3130	490077.12	3951926.83	508.35	GROUND PROOF 140
3131	491561.19	3946963.95	508.40	GROUND PROOF 141
3132	485883.18	3945474.50	530.95	GROUND PROOF 130
3133	480315.97	3946303.38	551.85	GROUND PROOF 112
3134	482722.20	3943088.00	531.90	GROUND PROOF 131
3135	478797.20	3940690.26	511.50	GROUND PROOF 113
3136	481897.59	3937364.94	508.85	GROUND PROOF 114
3137	486741.69	3940246.64	542.35	GROUND PROOF 129
3139	498785.08	3943857.96	524.85	GROUND PROOF 175
3141	509222.66	3940655.22	521.65	GROUND PROOF 212
3142	514857.48	3940653.41	546.65	GROUND PROOF 214
3144	509206.30	3951893.50	545.30	GROUND PROOF 182
3146	497993.84	3950294.23	538.80	GROUND PROOF 176
3147	504410.77	3947082.72	524.90	GROUND PROOF 183
3148	499608.14	3938021.89	510.55	GROUND PROOF 174
3149	494771.13	3936631.64	489.70	GROUND PROOF 143
3150	489944.81	3935021.46	517.70	GROUND PROOF 128
3151	484587.05	3932703.72	484.35	GROUND PROOF 116
3152	489378.63	3928658.29	494.35	GROUND PROOF 127
3154	494194.16	3920622.61	528.00	GROUND PROOF 146
3155	499767.25	3921421.01	508.50	GROUND PROOF 171
3156	505390.67	3919009.77	479.50	GROUND PROOF 188
3157	511870.06	3918186.72	437.85	GROUND PROOF 208
3159	523532.78	3918176.45	511.35	GROUND PROOF 252
3160	529384.20	3918179.34	501.35	GROUND PROOF 253
3161	530193.73	3924597.04	546.00	GROUND PROOF 256
3163	518946.76	3923022.91	515.70	GROUND PROOF 217
3164	513368.01	3923858.29	474.30	GROUND PROOF 209
3166	511768.88	3929434.29	509.70	GROUND PROOF 210
3167	518129.31	3929419.96	523.80	GROUND PROOF 216
3168	517303.75	3935875.22	525.50	GROUND PROOF 215
3170	504420.45	3936660.60	489.60	GROUND PROOF 185
3171	499762.47	3932652.92	457.65	GROUND PROOF 173
3172	494201.52	3931788.21	500.40	GROUND PROOF 144
3174	500829.02	3926935.33	494.75	GROUND PROOF 172
3175	505398.12	3931041.34	477.10	GROUND PROOF 186
3177	515006.26	3913003.33	448.30	GROUND PROOF 207
3178	506945.86	3914987.85	466.10	GROUND PROOF 189
3179	509383.90	3910171.36	441.55	GROUND PROOF 190



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3180	510191.98	3904543.46	467.65	GROUND PROOF 191
3181	509646.73	3898920.50	469.45	GROUND PROOF 192
3183	504103.59	3893220.22	492.35	GROUND PROOF 164
3184	497670.96	3893223.73	522.10	GROUND PROOF 152
3185	498140.66	3898912.76	486.45	GROUND PROOF 151
3187	503760.60	3904535.01	469.45	GROUND PROOF 167
3189	500565.71	3915686.27	466.90	GROUND PROOF 170
3191	487760.85	3917242.28	539.25	GROUND PROOF 124
3192	487747.79	3911752.73	543.65	GROUND PROOF 125
3194	492545.71	3898918.80	515.70	GROUND PROOF 150
3195	492547.31	3904098.16	553.00	GROUND PROOF 149
3196	492561.23	3909859.24	511.75	GROUND PROOF 148
3197	498151.77	3910166.93	520.35	GROUND PROOF 168
3198	497336.30	3904547.99	498.60	GROUND PROOF 166
3199	515012.39	3901112.60	451.85	GROUND PROOF 205
3200	515249.50	3895715.69	457.85	GROUND PROOF 204
3201	515516.38	3889280.26	440.80	GROUND PROOF 203
3202	521212.45	3890902.67	424.15	GROUND PROOF 223
3203	526763.65	3889304.59	443.20	GROUND PROOF 242
3204	532374.77	3889318.62	434.35	GROUND PROOF 243
3205	537973.56	3890953.82	443.00	GROUND PROOF 264
3207	531571.57	3894939.72	455.45	GROUND PROOF 245
3209	521433.29	3896212.76	440.30	GROUND PROOF 222
3210	522208.49	3902127.55	463.90	GROUND PROOF 221
3211	526213.48	3900536.22	445.00	GROUND PROOF 246
3212	531822.76	3900550.31	479.30	GROUND PROOF 247
3213	537436.83	3900569.35	439.50	GROUND PROOF 262
3214	539034.73	3906166.74	450.05	GROUND PROOF 261
3215	538210.21	3911790.31	475.60	GROUND PROOF 260
3217	541344.15	3923007.30	518.60	GROUND PROOF 258
3218	535729.50	3923807.03	507.05	GROUND PROOF 257
3219	535017.78	3918174.94	471.70	GROUND PROOF 254
3220	532615.22	3911741.94	463.35	GROUND PROOF 251
3222	520586.71	3913379.17	487.10	GROUND PROOF 219
3223	521406.69	3907740.36	470.30	GROUND PROOF 220
3224	526207.81	3906134.89	480.20	GROUND PROOF 248
3225	532624.13	3906152.83	447.70	GROUND PROOF 249
3226	497685.65	3870787.14	462.75	GROUND PROOF 156
3227	493439.78	3874779.29	473.20	GROUND PROOF 157
3228	497649.05	3876292.81	468.25	GROUND PROOF 155

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3229	497639.01	3882089.43	509.55	GROUND PROOF 154
3230	497656.55	3887574.59	511.45	GROUND PROOF 153
3231	509234.40	3887661.05	477.55	GROUND PROOF 194
3232	503305.44	3887577.65	477.05	GROUND PROOF 163
3233	503243.98	3882744.07	488.25	GROUND PROOF 162
3234	508903.74	3882723.35	456.75	GROUND PROOF 195
3235	508702.43	3876300.67	441.15	GROUND PROOF 196
3237	503351.08	3869926.80	440.85	GROUND PROOF 158
3238	508951.46	3869920.44	427.15	GROUND PROOF 197
3241	513787.77	3863476.25	449.85	GROUND PROOF 199
3242	502530.96	3864287.40	459.35	GROUND PROOF 159
3243	513799.15	3857831.34	478.70	GROUND PROOF 198
3244	519477.62	3859797.29	484.45	GROUND PROOF 229
3246	527975.82	3856168.13	529.50	GROUND PROOF 231
3247	525102.43	3860275.84	481.30	GROUND PROOF 232
3248	530315.72	3861871.82	507.55	GROUND PROOF 234
3249	532432.33	3866720.83	485.00	GROUND PROOF 235
3250	533050.52	3871550.51	441.10	GROUND PROOF 237
3252	521792.43	3871534.44	438.10	GROUND PROOF 227
3253	515378.84	3869909.39	430.40	GROUND PROOF 200
3254	520212.97	3865086.56	449.95	GROUND PROOF 228
3256	543856.56	3902997.69	443.90	GROUND PROOF 622
3257	548687.68	3899817.22	416.00	GROUND PROOF 274
3258	549234.44	3894236.70	413.40	GROUND PROOF 275
3259	550784.29	3888598.73	397.75	GROUND PROOF 276
3261	544391.69	3892586.41	441.35	GROUND PROOF 629
3262	542270.24	3898567.37	413.90	GROUND PROOF 628
3263	551407.46	3883250.92	381.60	GROUND PROOF 277
3264	551438.16	3878030.78	411.00	GROUND PROOF 278
3265	545802.07	3880427.55	425.85	GROUND PROOF 269
3267	539430.15	3873971.12	433.55	GROUND PROOF 267
3268	540172.30	3879600.36	444.35	GROUND PROOF 266
3269	537756.76	3884402.19	421.30	GROUND PROOF 265
3271	534587.47	3877155.71	424.60	GROUND PROOF 239
3272	528158.87	3877143.85	431.65	GROUND PROOF 238
3273	521751.42	3877127.42	412.50	GROUND PROOF 226
3275	515327.70	3882740.39	444.85	GROUND PROOF 202
3276	520887.11	3882753.04	423.40	GROUND PROOF 225
3277	526539.40	3882768.31	414.60	GROUND PROOF 240
3278	520393.72	3885983.26	412.05	GROUND PROOF 224

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3280	572681.04	3903164.41	440.85	GROUND PROOF 321
3282	561496.68	3901480.35	441.75	GROUND PROOF 293
3283	555094.51	3899852.57	461.70	GROUND PROOF 284
3284	549809.34	3905420.33	465.40	GROUND PROOF 273
3286	545378.49	3914992.39	478.45	GROUND PROOF 624
3287	545338.02	3920649.54	495.40	GROUND PROOF 625
3288	550137.31	3925442.67	504.65	GROUND PROOF 626
3289	551772.66	3920372.73	462.40	GROUND PROOF 627
3290	551818.71	3915041.01	493.25	GROUND PROOF 271
3291	551820.69	3909444.01	460.35	GROUND PROOF 272
3293	561371.47	3907340.57	417.70	GROUND PROOF 292
3294	558223.69	3911078.65	409.35	GROUND PROOF 286
3296	558166.67	3922301.33	474.70	GROUND PROOF 288
3297	563695.80	3923099.71	504.85	GROUND PROOF 289
3298	562989.75	3917463.42	492.10	GROUND PROOF 290
3299	563788.25	3911915.23	473.80	GROUND PROOF 291
3300	567806.35	3908753.99	418.60	GROUND PROOF 322
3302	573407.94	3909609.65	477.70	GROUND PROOF 324
3304	560341.21	3895868.53	435.55	GROUND PROOF 294
3305	564703.78	3897493.92	379.25	GROUND PROOF 317
3306	570425.90	3897527.87	452.70	GROUND PROOF 318
3308	573201.27	3886322.74	357.90	GROUND PROOF 314
3309	574626.69	3880563.83	380.65	GROUND PROOF 312
3311	574792.15	3869314.91	412.15	GROUND PROOF 308
3312	569256.53	3870075.13	428.85	GROUND PROOF 300
3313	569055.84	3874907.88	388.60	GROUND PROOF 310
3315	567218.95	3886294.54	416.20	GROUND PROOF 313
3316	567765.07	3892718.18	369.65	GROUND PROOF 316
3317	561968.45	3891093.08	447.80	GROUND PROOF 295
3318	562003.25	3886263.62	399.95	GROUND PROOF 296
3319	563623.61	3881463.28	389.70	GROUND PROOF 297
3320	563499.81	3875683.85	426.45	GROUND PROOF 298
3321	563536.07	3870061.76	429.00	GROUND PROOF 299
3322	557117.36	3871646.65	423.60	GROUND PROOF 279
3323	557056.90	3877252.63	421.50	GROUND PROOF 280
3325	557187.18	3888708.74	421.10	GROUND PROOF 282
3326	583884.03	3904060.60	425.80	GROUND PROOF 326
3327	588716.40	3904104.03	443.60	GROUND PROOF 328
3329	587177.02	3898513.56	372.15	GROUND PROOF 329
3330	580781.04	3899217.15	428.95	GROUND PROOF 327

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3331	575950.80	3897570.06	421.70	GROUND PROOF 319
3332	580396.33	3894376.22	403.10	GROUND PROOF 330
3333	579561.50	3889515.09	380.75	GROUND PROOF 332
3335	581090.09	3879823.29	389.70	GROUND PROOF 335
3336	581146.88	3874163.02	383.60	GROUND PROOF 336
3338	587480.94	3883109.88	340.75	GROUND PROOF 348
3339	582034.53	3884742.14	347.15	GROUND PROOF 347
3340	584374.70	3887181.26	342.70	GROUND PROOF 333
3341	585907.03	3892824.29	373.85	GROUND PROOF 331
3342	591074.49	3894480.87	381.25	GROUND PROOF 350
3343	590370.74	3888028.45	362.50	GROUND PROOF 349
3345	599975.63	3905022.46	395.80	GROUND PROOF 352
3346	600034.66	3899401.23	374.80	GROUND PROOF 353
3348	610623.38	3899529.70	415.35	GROUND PROOF 379
3349	614163.06	3893129.55	416.95	GROUND PROOF 409
3350	608218.98	3893833.02	386.00	GROUND PROOF 380
3351	602538.88	3893001.72	383.15	GROUND PROOF 377
3352	596977.78	3894553.39	348.35	GROUND PROOF 354
3353	601878.30	3887353.94	374.95	GROUND PROOF 376
3354	607453.64	3888227.73	353.95	GROUND PROOF 381
3356	593115.53	3878412.83	354.05	GROUND PROOF 356
3357	598777.83	3875854.46	329.10	GROUND PROOF 374
3359	611654.64	3875210.76	361.55	GROUND PROOF 406
3360	617275.45	3875471.24	367.65	GROUND PROOF 411
3361	617397.20	3881188.69	392.90	GROUND PROOF 410
3362	611581.62	3881346.90	362.10	GROUND PROOF 407
3363	605131.24	3882550.13	346.35	GROUND PROOF 382
3364	598735.44	3881696.74	344.80	GROUND PROOF 375
3365	592373.55	3872744.67	394.40	GROUND PROOF 357
3366	586874.45	3871827.72	413.40	GROUND PROOF 345
3367	580570.81	3868559.39	446.60	GROUND PROOF 337
3368	581249.28	3862530.56	419.25	GROUND PROOF 338
3370	581716.56	3852796.36	406.50	GROUND PROOF 340
3371	586473.28	3854996.60	360.05	GROUND PROOF 342
3373	597700.60	3853486.43	413.00	GROUND PROOF 370
3375	609851.34	3854484.43	337.90	GROUND PROOF 402
3376	610226.24	3859760.30	345.00	GROUND PROOF 403
3377	603783.25	3859942.33	353.15	GROUND PROOF 386
3378	597344.71	3859095.95	385.25	GROUND PROOF 371
3380	597292.05	3864765.33	362.60	GROUND PROOF 372

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3381	592493.88	3860652.44	377.10	GROUND PROOF 359
3382	587020.27	3860579.19	390.80	GROUND PROOF 343
3384	591763.74	3867956.67	346.30	GROUND PROOF 358
3385	597223.80	3870377.99	344.35	GROUND PROOF 373
3386	602622.74	3871642.61	327.45	GROUND PROOF 384
3387	563621.17	3862020.99	440.80	GROUND PROOF 304
3389	574821.79	3863700.10	429.80	GROUND PROOF 307
3390	574864.08	3858005.05	391.25	GROUND PROOF 306
3391	576372.47	3852467.05	409.05	GROUND PROOF 305
3392	570397.40	3853694.59	427.00	GROUND PROOF 303
3393	568435.07	3858839.25	424.90	GROUND PROOF 302
3394	595539.44	3834452.56	399.10	GROUND PROOF 363
3395	595926.17	3829583.24	393.10	GROUND PROOF 364
3396	595381.50	3844677.16	406.00	GROUND PROOF 362
3397	592311.79	3849487.32	425.65	GROUND PROOF 361
3398	586506.61	3849356.01	416.75	GROUND PROOF 341
3399	600679.92	3847958.74	395.90	GROUND PROOF 369
3400	601087.91	3841513.05	427.30	GROUND PROOF 368
3402	615322.33	3854255.19	343.85	GROUND PROOF 417
3403	612387.39	3848082.08	387.10	GROUND PROOF 401
3404	617173.12	3846509.04	392.25	GROUND PROOF 419
3405	619213.34	3841576.76	336.55	GROUND PROOF 420
3406	611832.53	3843230.41	371.10	GROUND PROOF 400
3407	606445.89	3843177.40	385.60	GROUND PROOF 389
3408	607497.47	3837822.89	379.75	GROUND PROOF 390
3410	618801.21	3835201.34	348.55	GROUND PROOF 421
3411	617248.76	3830400.69	364.45	GROUND PROOF 422
3412	617324.34	3824696.96	368.45	GROUND PROOF 423
3413	612532.57	3820680.37	318.80	GROUND PROOF 394
3414	607021.85	3820779.74	347.10	GROUND PROOF 393
3415	602016.06	3824668.86	365.95	GROUND PROOF 366
3416	606810.54	3825837.06	336.85	GROUND PROOF 392
3418	612399.05	3832554.31	373.05	GROUND PROOF 398
3419	606437.49	3831892.08	371.30	GROUND PROOF 391
3421	601510.38	3835066.66	390.50	GROUND PROOF 367
3422	644688.18	3871035.53	349.25	GROUND PROOF 466
3423	639058.71	3870138.39	330.05	GROUND PROOF 465
3425	642363.22	3864567.38	317.00	GROUND PROOF 467
3426	645666.45	3859029.45	297.75	GROUND PROOF 469
3428	633592.21	3857952.69	300.65	GROUND PROOF 446

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3429	631116.76	3863327.76	333.60	GROUND PROOF 440
3430	627942.30	3858567.91	300.30	GROUND PROOF 445
3431	622518.68	3856540.15	302.45	GROUND PROOF 433
3432	623080.72	3861913.21	332.80	GROUND PROOF 434
3434	610158.14	3865701.88	313.85	GROUND PROOF 404
3435	608496.85	3870526.42	318.70	GROUND PROOF 405
3436	616604.49	3864738.45	326.85	GROUND PROOF 415
3438	621392.94	3868408.97	366.90	GROUND PROOF 435
3440	627031.87	3870774.37	334.45	GROUND PROOF 436
3441	622896.89	3875550.00	367.95	GROUND PROOF 412
3443	634142.06	3875727.61	366.15	GROUND PROOF 437
3444	632623.88	3869222.85	343.65	GROUND PROOF 438
3446	652799.05	3866319.09	325.10	GROUND PROOF 515
3447	657382.21	3864780.98	334.55	GROUND PROOF 514
3448	663290.95	3863275.03	326.20	GROUND PROOF 516
3450	660926.69	3851949.93	273.35	GROUND PROOF 518
3451	666686.65	3852022.42	302.60	GROUND PROOF 542
3452	673234.82	3852126.56	292.10	GROUND PROOF 545
3453	655441.93	3852968.45	287.70	GROUND PROOF 512
3454	657604.59	3858344.65	302.60	GROUND PROOF 513
3455	652100.84	3859664.27	322.65	GROUND PROOF 470
3456	649838.91	3853390.52	284.15	GROUND PROOF 472
3457	643470.46	3853294.74	310.15	GROUND PROOF 471
3458	638269.90	3853285.61	291.15	GROUND PROOF 462
3460	626026.02	3851255.23	304.20	GROUND PROOF 432
3461	628542.53	3847008.40	365.10	GROUND PROOF 442
3462	633999.70	3845595.54	319.50	GROUND PROOF 443
3463	639550.94	3847446.41	298.85	GROUND PROOF 461
3464	645936.59	3847773.68	297.70	GROUND PROOF 473
3465	617767.67	3819130.91	333.45	GROUND PROOF 424
3466	623232.27	3819199.58	327.70	GROUND PROOF 426
3468	618407.84	3812686.02	330.05	GROUND PROOF 396
3469	624013.84	3812749.22	329.30	GROUND PROOF 425
3470	628840.36	3812806.44	297.35	GROUND PROOF 451
3471	628933.59	3807072.49	341.25	GROUND PROOF 452
3473	622682.94	3824894.94	331.15	GROUND PROOF 427
3474	628615.55	3824926.95	342.05	GROUND PROOF 449
3475	628542.72	3830530.05	348.70	GROUND PROOF 448
3476	630078.46	3836475.09	362.15	GROUND PROOF 447
3477	630806.46	3841434.34	316.40	GROUND PROOF 444

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3478	625160.32	3841784.75	348.50	GROUND PROOF 430
3479	622864.10	3846437.99	339.15	GROUND PROOF 431
3480	620331.19	3851387.85	328.20	GROUND PROOF 418
3481	625250.22	3836163.93	360.25	GROUND PROOF 429
3482	622884.52	3830468.88	335.15	GROUND PROOF 428
3483	669041.15	3856878.36	296.25	GROUND PROOF 543
3484	674579.55	3856969.88	296.25	GROUND PROOF 544
3485	680988.24	3857232.36	338.80	GROUND PROOF 630
3487	681194.77	3847457.72	302.65	GROUND PROOF 644
3488	686093.12	3844310.70	346.30	GROUND PROOF 645
3490	679829.38	3836821.69	328.55	GROUND PROOF 642
3491	673446.56	3834415.98	291.80	GROUND PROOF 548
3493	667842.17	3841380.40	268.90	GROUND PROOF 540
3494	673752.85	3840865.78	289.25	GROUND PROOF 547
3495	676413.80	3846556.90	293.80	GROUND PROOF 546
3496	670000.77	3847230.48	288.05	GROUND PROOF 541
3498	657363.75	3847853.73	281.10	GROUND PROOF 511
3499	651562.17	3846976.58	307.95	GROUND PROOF 474
3500	656456.22	3842228.06	295.85	GROUND PROOF 510
3501	661477.49	3835830.98	281.10	GROUND PROOF 520
3502	655748.65	3836574.65	316.40	GROUND PROOF 509
3503	650297.63	3835686.43	310.45	GROUND PROOF 478
3504	644515.81	3836606.83	317.25	GROUND PROOF 477
3505	637305.35	3836741.16	387.60	GROUND PROOF 459
3507	639796.75	3830691.11	316.75	GROUND PROOF 479
3508	646219.90	3830779.60	295.00	GROUND PROOF 480
3510	657471.51	3830955.48	309.05	GROUND PROOF 508
3511	663967.90	3830629.42	268.60	GROUND PROOF 521
3513	644429.36	3841633.69	328.10	GROUND PROOF 475
3514	638833.54	3841816.80	337.40	GROUND PROOF 460
3515	634570.86	3812889.06	319.90	GROUND PROOF 455
3516	634398.46	3819350.18	308.00	GROUND PROOF 456
3517	635320.42	3825105.03	307.65	GROUND PROOF 457
3518	640712.97	3824263.37	278.15	GROUND PROOF 484
3519	646317.50	3825153.35	276.15	GROUND PROOF 483
3521	646535.01	3813766.98	330.50	GROUND PROOF 489
3522	647441.54	3808223.65	310.20	GROUND PROOF 491
3523	648328.69	3802538.15	280.35	GROUND PROOF 494
3525	642124.72	3801739.72	282.95	GROUND PROOF 493
3526	641999.18	3807376.91	315.75	GROUND PROOF 492

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3527	640099.18	3812975.05	314.20	GROUND PROOF 488
3528	641654.48	3818821.90	274.30	GROUND PROOF 485
3530	635407.08	3801630.91	333.00	GROUND PROOF 454
3531	663990.52	3825011.67	250.30	GROUND PROOF 522
3532	658487.15	3825219.11	285.55	GROUND PROOF 507
3533	652741.98	3825246.32	284.45	GROUND PROOF 482
3534	652836.88	3819614.38	291.50	GROUND PROOF 487
3536	664374.72	3819338.36	296.40	GROUND PROOF 523
3537	670105.56	3819781.80	245.90	GROUND PROOF 536
3538	675317.98	3819997.77	278.55	GROUND PROOF 551
3539	680940.97	3820128.25	281.50	GROUND PROOF 636
3540	686459.42	3821764.51	299.70	GROUND PROOF 637
3542	688107.38	3827448.73	325.10	GROUND PROOF 639
3543	693695.45	3826739.46	380.30	GROUND PROOF 559
3544	698633.85	3822002.00	360.45	GROUND PROOF 574
3545	692336.14	3820743.81	350.15	GROUND PROOF 560
3546	681767.07	3825712.22	306.40	GROUND PROOF 638
3547	680737.91	3831331.53	330.00	GROUND PROOF 640
3548	675113.61	3831233.70	306.50	GROUND PROOF 549
3549	669458.44	3831137.81	259.20	GROUND PROOF 538
3551	673672.43	3825608.13	297.25	GROUND PROOF 550
3552	681840.91	3813719.49	283.70	GROUND PROOF 634
3553	688218.78	3815337.72	335.05	GROUND PROOF 635
3554	686102.49	3809817.25	283.55	GROUND PROOF 633
3555	683654.54	3804546.72	292.90	GROUND PROOF 632
3556	688456.64	3803134.40	281.65	GROUND PROOF 563
3557	695218.65	3799511.58	315.95	GROUND PROOF 565
3558	695735.41	3804266.21	333.25	GROUND PROOF 564
3559	701688.06	3806006.15	302.00	GROUND PROOF 577
3560	705518.27	3806099.13	315.55	GROUND PROOF 590
3561	710940.09	3805945.04	297.30	GROUND PROOF 591
3563	705601.46	3810935.15	317.85	GROUND PROOF 587
3564	711404.87	3812676.69	321.10	GROUND PROOF 589
3566	699674.66	3811264.42	321.65	GROUND PROOF 576
3567	694651.91	3815520.34	331.30	GROUND PROOF 561
3568	700651.49	3817267.59	345.95	GROUND PROOF 575
3569	653128.66	3812541.94	390.80	GROUND PROOF 490
3570	665449.19	3813843.96	368.80	GROUND PROOF 524
3571	658703.65	3813731.60	391.25	GROUND PROOF 505
3572	660412.81	3807461.47	401.35	GROUND PROOF 504



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3573	670890.41	3808504.58	371.00	GROUND PROOF 534
3574	665636.77	3808306.51	366.80	GROUND PROOF 525
3575	659591.11	3801776.53	289.85	GROUND PROOF 503
3576	654071.95	3802778.07	291.60	GROUND PROOF 498
3577	654027.68	3797084.54	272.40	GROUND PROOF 496
3578	654325.24	3791482.72	302.35	GROUND PROOF 497
3579	660670.70	3785925.35	286.50	GROUND PROOF 500
3581	665355.24	3791847.35	267.80	GROUND PROOF 528
3582	659971.47	3790749.37	273.25	GROUND PROOF 501
3585	671686.79	3797402.16	258.40	GROUND PROOF 532
3586	666063.27	3797295.29	247.55	GROUND PROOF 527
3587	666865.17	3802248.08	298.10	GROUND PROOF 526
3588	670452.53	3803038.30	292.65	GROUND PROOF 533
3589	670789.67	3814071.16	251.00	GROUND PROOF 535
3593	690156.78	3796933.40	253.85	GROUND PROOF 566
3594	689249.83	3792079.43	213.20	GROUND PROOF 567
3596	697483.09	3788108.53	205.50	GROUND PROOF 572
3597	692173.30	3786495.66	252.85	GROUND PROOF 568
3599	694958.52	3778236.68	287.80	GROUND PROOF 570
3600	691576.70	3781653.61	268.05	GROUND PROOF 569
3601	685667.64	3781528.04	272.10	GROUND PROOF 558
3603	679132.22	3786433.36	242.50	GROUND PROOF 557
3604	671840.55	3786223.60	273.00	GROUND PROOF 530
3605	672605.82	3791852.19	226.40	GROUND PROOF 531
3606	677403.29	3792134.61	228.80	GROUND PROOF 556
3607	683240.29	3792364.17	254.95	GROUND PROOF 631
3608	703999.22	3800434.79	284.50	GROUND PROOF 578
3609	709408.63	3802958.13	277.85	GROUND PROOF 592
3610	715230.61	3803083.44	272.30	GROUND PROOF 593
3612	709525.14	3797511.25	260.65	GROUND PROOF 594
3613	704717.52	3794802.21	256.60	GROUND PROOF 579
3614	706481.20	3789250.32	210.60	GROUND PROOF 580
3615	712068.63	3791642.20	220.20	GROUND PROOF 596
3616	718411.52	3791873.51	225.95	GROUND PROOF 597
3618	709837.43	3783028.17	242.25	GROUND PROOF 601
3619	712523.00	3781565.48	209.35	GROUND PROOF 602
3620	708307.02	3779460.03	254.15	GROUND PROOF 586
3621	702724.35	3779051.83	263.45	GROUND PROOF 582
3622	702744.44	3784716.16	204.25	GROUND PROOF 581
3623	717970.18	3779810.15	215.25	GROUND PROOF 619

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3624	718167.58	3786229.70	192.00	GROUND PROOF 599
3626	714084.14	3774048.74	213.00	GROUND PROOF 603
3628	703185.74	3773828.08	264.20	GROUND PROOF 583
3629	708286.13	3769096.29	241.65	GROUND PROOF 584
3630	714133.39	3768464.20	220.45	GROUND PROOF 605
3631	714853.49	3762348.70	219.55	GROUND PROOF 607
3632	719734.15	3762304.99	229.15	GROUND PROOF 608
3633	721017.64	3759025.08	204.60	GROUND PROOF 616
3634	725788.94	3762334.32	225.55	GROUND PROOF 609
3635	731860.16	3763177.26	210.55	GROUND PROOF 614
3636	731010.34	3758327.88	210.15	GROUND PROOF 617
3638	725453.33	3751748.69	203.80	GROUND PROOF 618
3639	726013.37	3768676.06	221.55	GROUND PROOF 610
3640	731913.38	3768807.26	240.40	GROUND PROOF 612
3641	731689.40	3774441.44	226.80	GROUND PROOF 613
3642	730846.25	3780879.39	236.25	GROUND PROOF 621
3643	725207.72	3780760.89	218.55	GROUND PROOF 620
3645	719706.68	3774187.38	238.15	GROUND PROOF 604
3648	694173.31	4013451.26	302.10	GROUND PROOF 2648
3649	703782.01	4018474.40	252.75	GROUND PROOF 2650
3650	707111.83	4023798.95	249.40	GROUND PROOF 2651
3652	713364.64	4031612.68	233.85	GROUND PROOF 2653
3653	697415.39	3928784.98	297.00	GROUND PROOF 2668
3655	695676.12	3936220.50	253.55	GROUND PROOF 2669
3656	695712.57	3939423.72	256.15	GROUND PROOF 2655
3658	697230.79	3944301.20	244.35	GROUND PROOF 2656
3659	702012.94	3945231.66	244.10	GROUND PROOF 2657

**Ground Control Coordinates Add-on Area UTM Zone 14**

**Ground Proof Coordinates Add-on Area UTM Zone 14**

**Project Name: NRCS Oklahoma**

**AMEC Project #: 09-117-70105**

**Coordinate System: UTM Zone 14**

**UNITS: Meters**

**Horizontal Datum: NAD83**

**Vertical Datum: NAVD88**

**ELEV\*: REPORTED TO NEAREST 0.05m**

Name	EastM_UTM14_NAD83	NorthM_UTM14_NAD83	ElevM_NAVD88	Submittal Desc.
3670	746165.27	3779594.40	214.40	GROUND PROOF(2) 886

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

3672	756768.55	3778262.28	211.00	GROUND PROOF(2) 896
3673	755110.78	3779814.27	224.15	GROUND PROOF(2) 787
3674	747020.92	3784598.61	206.90	GROUND PROOF(2) 882
3675	753367.49	3784744.99	206.00	GROUND PROOF(2) 883
3676	754923.97	3789501.80	186.25	GROUND PROOF(2) 876
3677	753176.16	3793879.68	178.60	GROUND PROOF(2) 869
3679	750088.83	3789483.88	177.20	GROUND PROOF(2) 875
3681	746750.75	3793644.53	203.50	GROUND PROOF(2) 868
3682	741342.07	3793957.79	213.25	GROUND PROOF(2) 867
3683	733718.51	3795467.02	209.95	GROUND PROOF(2) 856
3684	730591.01	3791353.59	214.65	GROUND PROOF(2) 865
3685	726596.70	3795302.62	220.25	GROUND PROOF(2) 855
3686	720824.18	3795156.43	240.55	GROUND PROOF(2) 854
3687	725176.08	3791523.91	224.10	GROUND PROOF(2) 864
3688	729128.49	3785277.91	239.40	GROUND PROOF(2) 776
3689	734894.94	3785156.81	204.50	GROUND PROOF(2) 777
3691	740786.85	3781060.67	187.85	GROUND PROOF(2) 885
3692	736799.38	3790460.73	231.95	GROUND PROOF(2) 866
3693	740714.04	3785884.82	218.10	GROUND PROOF(2) 778
3694	761503.02	3779992.06	211.30	GROUND PROOF(2) 788
3696	766737.78	3780133.27	182.00	GROUND PROOF(2) 890
3697	771563.60	3782796.40	165.40	GROUND PROOF(2) 891
3699	768120.44	3773718.57	218.15	GROUND PROOF(2) 792
3700	772209.81	3771411.62	205.05	GROUND PROOF(2) 895
3703	779880.82	3781281.26	145.05	GROUND PROOF(2) 791
3704	775896.87	3781968.08	171.55	GROUND PROOF(2) 892
3705	757220.93	3782296.63	198.35	GROUND PROOF(2) 888
3706	760063.10	3786395.46	176.40	GROUND PROOF(2) 884
3707	766261.67	3786559.97	163.90	GROUND PROOF(2) 881
3708	759711.66	3791196.01	159.45	GROUND PROOF(2) 877
3710	769977.67	3793106.67	168.70	GROUND PROOF(2) 872
3711	769480.60	3787262.16	163.10	GROUND PROOF(2) 879
3713	778719.79	3786884.36	174.60	GROUND PROOF(2) 784
3714	774222.80	3791102.60	166.65	GROUND PROOF(2) 880
3715	769483.94	3776235.24	198.35	GROUND PROOF(2) 893
3716	760268.24	3800541.90	182.75	GROUND PROOF(2) 861
3717	754799.87	3800765.96	176.25	GROUND PROOF(2) 860
3718	749826.14	3799391.56	171.00	GROUND PROOF(2) 859
3719	744201.15	3798853.56	188.05	GROUND PROOF(2) 858
3720	738630.51	3798286.17	219.50	GROUND PROOF(2) 857

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

3721	738871.20	3803559.07	206.95	GROUND PROOF(2) 831
3722	735183.42	3807689.53	192.65	GROUND PROOF(2) 819
3723	741508.70	3808456.30	198.10	GROUND PROOF(2) 820
3725	747220.00	3808582.81	175.60	GROUND PROOF(2) 821
3726	753086.92	3808770.26	202.65	GROUND PROOF(2) 822
3727	750795.82	3803871.40	184.55	GROUND PROOF(2) 833
3729	761705.01	3805772.11	192.35	GROUND PROOF(2) 835
3730	765899.07	3800291.57	192.70	GROUND PROOF(2) 862
3731	764436.08	3794904.82	167.30	GROUND PROOF(2) 871
3732	771588.93	3799590.45	191.75	GROUND PROOF(2) 863
3734	779762.84	3793396.57	197.15	GROUND PROOF(2) 775
3736	732834.01	3816434.63	228.05	GROUND PROOF(2) 743
3737	735046.03	3813145.86	202.10	GROUND PROOF(2) 818
3738	741432.91	3813288.78	188.00	GROUND PROOF(2) 811
3739	729327.21	3811499.69	223.55	GROUND PROOF(2) 815
3740	723809.95	3804898.92	268.10	GROUND PROOF(2) 816
3741	717405.51	3805161.13	284.20	GROUND PROOF(2) 751
3742	721058.24	3800588.45	235.70	GROUND PROOF(2) 828
3743	727134.88	3800952.31	245.55	GROUND PROOF(2) 829
3744	730023.75	3805855.05	246.60	GROUND PROOF(2) 817
3746	717265.94	3811197.95	294.80	GROUND PROOF(2) 813
3747	723494.76	3811339.69	273.20	GROUND PROOF(2) 814
3749	717150.70	3816033.09	305.00	GROUND PROOF(2) 741
3750	710725.03	3814863.76	343.75	GROUND PROOF(2) 740
3751	718985.60	3820804.38	330.30	GROUND PROOF(2) 734
3752	719852.49	3824049.19	339.60	GROUND PROOF(2) 827
3753	715167.73	3825561.89	348.10	GROUND PROOF(2) 826
3755	715404.69	3835233.53	288.80	GROUND PROOF(2) 841
3756	721102.10	3836158.10	217.45	GROUND PROOF(2) 842
3758	723044.50	3841863.90	226.60	GROUND PROOF(2) 709
3760	735787.83	3841264.71	209.90	GROUND PROOF(2) 840
3761	741328.15	3842312.89	228.45	GROUND PROOF(2) 712
3762	744018.99	3839155.33	227.35	GROUND PROOF(2) 848
3763	739988.53	3838244.34	212.65	GROUND PROOF(2) 847
3764	734483.48	3835713.15	211.80	GROUND PROOF(2) 844
3765	728041.10	3835540.79	202.65	GROUND PROOF(2) 843
3766	723360.25	3829773.11	236.65	GROUND PROOF(2) 823
3767	729807.39	3829108.32	216.35	GROUND PROOF(2) 724
3769	727670.30	3821079.30	238.75	GROUND PROOF(2) 735
3770	729159.46	3822270.19	218.75	GROUND PROOF(2) 836

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

3772	734706.94	3826306.59	196.55	GROUND PROOF(2) 849
3773	739541.24	3826134.58	194.60	GROUND PROOF(2) 795
3774	738053.15	3821259.12	198.35	GROUND PROOF(2) 737
3775	743994.97	3823052.59	204.80	GROUND PROOF(2) 738
3776	744279.94	3818395.96	180.75	GROUND PROOF(2) 809
3777	746647.34	3814234.99	211.00	GROUND PROOF(2) 812
3779	749326.47	3818500.52	218.35	GROUND PROOF(2) 810
3781	754987.74	3824740.52	187.60	GROUND PROOF(2) 808
3782	756333.91	3829842.24	201.75	GROUND PROOF(2) 728
3783	755405.81	3834015.42	199.00	GROUND PROOF(2) 850
3785	750695.90	3829304.78	203.25	GROUND PROOF(2) 727
3786	743844.91	3829455.31	199.50	GROUND PROOF(2) 726
3787	740638.65	3832539.69	198.95	GROUND PROOF(2) 846
3788	744142.87	3834934.22	222.50	GROUND PROOF(2) 851
3790	712332.13	3820655.36	335.20	GROUND PROOF(2) 794
3791	709008.21	3825438.04	352.15	GROUND PROOF(2) 733
3792	710196.44	3830291.36	337.00	GROUND PROOF(2) 824
3794	710197.14	3842388.19	292.55	GROUND PROOF(2) 692
3795	714546.34	3846648.98	304.40	GROUND PROOF(2) 703
3796	721309.26	3846657.80	261.40	GROUND PROOF(2) 704
3797	726961.21	3846816.42	243.15	GROUND PROOF(2) 805
3798	732633.22	3845338.79	239.35	GROUND PROOF(2) 839
3799	732492.55	3851052.62	238.80	GROUND PROOF(2) 838
3800	730652.59	3855779.37	235.60	GROUND PROOF(2) 697
3801	729539.70	3861108.19	292.35	GROUND PROOF(2) 698
3803	720262.14	3857665.17	288.65	GROUND PROOF(2) 802
3804	724316.45	3855601.38	293.80	GROUND PROOF(2) 696
3805	713745.97	3860959.83	296.55	GROUND PROOF(2) 799
3806	711594.37	3857963.14	268.15	GROUND PROOF(2) 798
3808	714147.24	3851305.69	317.15	GROUND PROOF(2) 699
3809	714733.13	3855065.25	293.80	GROUND PROOF(2) 800
3811	726037.52	3851634.12	247.55	GROUND PROOF(2) 701
3812	705043.53	3822135.05	358.75	GROUND PROOF(2) 825
3813	697688.04	3828436.06	383.35	GROUND PROOF(2) 719
3814	697551.44	3834994.05	370.75	GROUND PROOF(2) 690
3815	691086.59	3835827.73	377.30	GROUND PROOF(2) 684
3816	686195.32	3839485.15	363.40	GROUND PROOF(2) 680
3817	695032.98	3839665.27	352.40	GROUND PROOF(2) 683
3819	687632.24	3847535.17	349.45	GROUND PROOF(2) 853
3820	684326.73	3852339.95	345.60	GROUND PROOF(2) 671

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

3821	690391.61	3852463.12	343.75	GROUND PROOF(2) 672
3823	700422.54	3849469.62	288.70	GROUND PROOF(2) 685
3824	705302.17	3847500.36	287.65	GROUND PROOF(2) 804
3825	697347.98	3844563.05	343.35	GROUND PROOF(2) 682
3826	692444.49	3847488.85	326.55	GROUND PROOF(2) 678
3827	699829.32	3839774.31	359.15	GROUND PROOF(2) 837
3829	703954.20	3835015.64	369.20	GROUND PROOF(2) 689
3830	704099.70	3828615.98	365.85	GROUND PROOF(2) 720
3831	686852.26	3857214.88	338.40	GROUND PROOF(2) 852
3832	692243.40	3857345.54	321.30	GROUND PROOF(2) 673
3833	698732.68	3855098.92	322.50	GROUND PROOF(2) 676
3834	705140.86	3854392.31	322.65	GROUND PROOF(2) 797
3835	703461.79	3858359.85	311.90	GROUND PROOF(2) 677
3837	692312.10	3863142.85	332.35	GROUND PROOF(2) 674

**Ground Control Coordinates Zone 15 Area UTM Zone 15**

**Ground Proof Coordinates (Complete Submittal 2)**

**Project Name: NRCS Oklahoma**

**AMEC Project #: 09-117-70105**

**Coordinate System: UTM Zone 15**

**UNITS: Meters**

**Horizontal Datum: NAD83**

**Vertical Datum: NAVD88**

**ELEV\*: REPORTED TO NEAREST 0.05m**

Name	EastM_UTM15_NAD83	NorthM_UTM15_NAD83	ElevM_NAVD88	Submittal Desc.
3660	333227.87	3919156.80	177.30	664 GROUND PROOF
3661	336880.34	3921094.12	154.40	658 GROUND PROOF
3663	345026.26	3925784.48	162.90	665 GROUND PROOF
3664	345078.59	3929013.99	170.80	660 GROUND PROOF
3665	346665.79	3932199.83	205.00	661 GROUND PROOF
3666	314419.92	3837897.92	192.00	667 GROUND PROOF
3668	312184.84	3844399.88	204.85	666 GROUND PROOF
3669	311931.88	3847647.04	210.05	663 GROUND PROOF

## NRCS Oklahoma Dam Rehab LiDAR Mapping Report

### LiDAR Control Reports

The following listings shows the results of the LiDAR data compared to the GPS ground survey control data. The listing is sorted by the **Z Error** column showing, in ascending order, the vertical difference between the LiDAR points and the surveyed ground control points.

#### Post-filter Control Report for Area 1

**Project File: Area 1**  
**Project Unit: Meter**  
**Date: Wednesday: February 10: 2010**  
**Vertical Accuracy Objective**  
**Requirement Type: Accuracy(z)**  
**Accuracy(z) Objective: 0.36**  
**Confidence Level: 95%**  
**Control Points in Report: 521**  
**Elevation Calculation Method: Interpolated from TIN**  
**Control Points with LiDAR Coverage: 106**  
**Control Points with Required Accuracy ( 0.36): 106**  
**Percent of Control Points with Required Accuracy ( 0.36): 100.00**  
**Average Control Error Reported: -0.05**  
**Maximum (highest) Control Error Reported: 0.13**  
**Median Control Error Reported: -0.04**  
**Minimum (lowest) Control Error Reported: -0.26**  
**Standard deviation (sigma) of Z for sample: 0.08**  
**RMSE of Z for sample ( RMSE(z) ): 0.09: PASS**  
**FGDC/NSSDA Vertical Accuracy ( Accuracy(z) ): 0.18: PASS**  
**NSSDA Achievable Contour Interval: 0.4**  
**ASPRS Class 1 Achievable Contour Interval: 0.3**  
**NMAS Achievable Contour Interval: 0.4**

Control	Control Pt.	Control Pt.	Coverage	Control Pt.	from LiDAR	Z Error	Min Z	Median Z	Max Z
Point Id	X(East)	Y(North)		Z(Elev)	Z(Elev)				
	Meters	Meters		Meters	Meters	Meters	Meters	Meters	Meters
3058	448488.94	3965992.70	Yes	670.30	670.04	<b>-0.26</b>	670.04	670.04	670.05
3003	416280.67	3954782.47	Yes	721.50	721.30	<b>-0.20</b>	721.27	721.32	721.35
3020	426829.42	3960220.77	Yes	714.40	714.22	<b>-0.18</b>	714.18	714.23	714.35
3079	471609.39	3963165.01	Yes	609.10	608.93	<b>-0.17</b>	608.91	608.93	608.93
3024	432404.07	3955381.94	Yes	696.20	696.03	<b>-0.17</b>	695.90	696.04	696.05
3032	421434.26	3937851.34	Yes	711.60	711.44	<b>-0.16</b>	711.38	711.52	711.58
3029	417405.09	3933143.18	Yes	760.30	760.14	<b>-0.16</b>	760.12	760.15	760.15
3025	432458.42	3961792.69	Yes	715.00	714.84	<b>-0.16</b>	714.82	714.85	714.88
3014	419627.60	3964364.47	Yes	724.55	724.39	<b>-0.16</b>	724.39	724.39	724.41

## NRCS Oklahoma Dam Rehab LiDAR Mapping Report

3012	414784.59	3965234.82	Yes	739.50	739.34	<b>-0.16</b>	739.29	739.34	739.43
3010	409814.43	3954883.13	Yes	712.50	712.34	<b>-0.16</b>	712.34	712.34	712.39
3005	416152.45	3943533.33	Yes	729.90	729.74	<b>-0.16</b>	729.73	729.73	729.77
3004	415453.88	3949159.74	Yes	754.80	754.64	<b>-0.16</b>	754.63	754.63	754.66
3082	467305.42	3973335.61	Yes	671.55	671.40	<b>-0.15</b>	671.30	671.39	671.43
3034	438988.02	3932887.73	Yes	686.55	686.40	<b>-0.15</b>	686.33	686.39	686.41
3022	428629.63	3951610.87	Yes	627.90	627.75	<b>-0.15</b>	627.71	627.75	627.86
3013	419655.38	3969985.36	Yes	756.80	756.65	<b>-0.15</b>	756.55	756.59	756.67
3064	448332.14	3947699.88	Yes	597.05	596.91	<b>-0.14</b>	596.89	596.89	596.94
3045	439771.50	3947958.56	Yes	597.50	597.36	<b>-0.14</b>	597.31	597.35	597.40
3011	409899.74	3960500.60	Yes	711.20	711.06	<b>-0.14</b>	711.03	711.07	711.11
3106	463762.80	3929551.98	Yes	621.90	621.77	<b>-0.13</b>	621.73	621.75	621.80
3051	433330.45	3926903.56	Yes	730.30	730.17	<b>-0.13</b>	730.14	730.20	730.21
3000	421015.73	3947004.64	Yes	673.80	673.67	<b>-0.13</b>	673.61	673.68	673.68
3107	468547.07	3931150.60	Yes	579.65	579.53	<b>-0.12</b>	579.49	579.51	579.54
3089	461125.01	3951209.11	Yes	586.90	586.78	<b>-0.12</b>	586.74	586.74	586.80
3061	455012.18	3961647.09	Yes	589.05	588.93	<b>-0.12</b>	588.92	588.92	588.93
3002	422375.22	3955033.96	Yes	657.65	657.53	<b>-0.12</b>	657.48	657.52	657.57
3001	421067.09	3950709.34	Yes	696.35	696.23	<b>-0.12</b>	696.22	696.25	696.31
3112	471727.28	3919003.36	Yes	591.85	591.74	<b>-0.11</b>	591.62	591.68	591.77
3054	444454.34	3952491.57	Yes	603.10	603.00	<b>-0.10</b>	602.98	602.98	603.02
3039	444788.43	3937479.56	Yes	603.35	603.25	<b>-0.10</b>	603.25	603.26	603.27
3031	422983.15	3933059.84	Yes	757.55	757.45	<b>-0.10</b>	757.42	757.48	757.50
3127	478772.16	3957602.27	Yes	578.00	577.91	<b>-0.09</b>	577.88	577.90	577.96
3015	421211.04	3960298.01	Yes	712.10	712.01	<b>-0.09</b>	711.95	711.99	712.05
3006	409714.89	3943733.20	Yes	752.30	752.22	<b>-0.08</b>	752.14	752.21	752.23
3154	494194.16	3920622.61	Yes	528.00	527.93	<b>-0.07</b>	527.88	527.95	527.96
3084	460423.17	3962299.02	Yes	612.85	612.78	<b>-0.07</b>	612.75	612.76	612.82
3043	440288.91	3945709.92	Yes	588.50	588.43	<b>-0.07</b>	588.38	588.39	588.47
3023	434526.42	3950123.93	Yes	686.80	686.73	<b>-0.07</b>	686.71	686.72	686.78
3017	425325.19	3950634.77	Yes	633.95	633.88	<b>-0.07</b>	633.85	633.87	633.91
3081	467628.26	3968012.84	Yes	619.95	619.89	<b>-0.06</b>	619.86	619.88	619.94
3055	443625.96	3955855.40	Yes	632.50	632.44	<b>-0.06</b>	632.40	632.44	632.49
3048	427035.63	3937791.52	Yes	701.85	701.79	<b>-0.06</b>	701.74	701.80	701.82
3044	443478.95	3945678.74	Yes	608.15	608.10	<b>-0.05</b>	608.07	608.07	608.11
3042	439433.59	3943304.14	Yes	587.60	587.55	<b>-0.05</b>	587.54	587.56	587.60
3130	490077.12	3951926.83	Yes	508.35	508.31	<b>-0.04</b>	508.28	508.28	508.34
3121	493208.80	3961542.34	Yes	566.80	566.76	<b>-0.04</b>	566.73	566.77	566.81
3096	484586.97	3926266.72	Yes	529.55	529.51	<b>-0.04</b>	529.42	529.57	529.58
3094	480436.99	3915035.78	Yes	582.00	581.96	<b>-0.04</b>	581.85	581.89	582.06



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3085	466040.78	3962333.99	Yes	594.40	594.36	-0.04	594.34	594.35	594.38
3078	473183.76	3957722.53	Yes	559.95	559.91	-0.04	559.90	559.92	559.92
3063	450065.79	3953685.54	Yes	634.45	634.41	-0.04	634.31	634.39	634.44
3062	454770.94	3956856.14	Yes	619.15	619.11	-0.04	619.06	619.11	619.19
3059	454844.10	3966435.05	Yes	609.95	609.91	-0.04	609.90	609.91	609.92
3047	431038.60	3940975.13	Yes	631.45	631.41	-0.04	631.34	631.46	631.47
3191	487760.85	3917242.28	Yes	539.25	539.22	-0.03	539.20	539.27	539.28
3109	478139.03	3925471.58	Yes	547.75	547.72	-0.03	547.70	547.71	547.72
3098	476268.51	3935876.75	Yes	528.00	527.97	-0.03	527.91	527.98	528.03
3075	467828.54	3945547.99	Yes	525.70	525.67	-0.03	525.64	525.71	525.72
3068	454063.40	3935962.19	Yes	567.70	567.67	-0.03	567.66	567.67	567.72
3050	433367.58	3932581.09	Yes	709.35	709.32	-0.03	709.23	709.33	709.34
3028	409635.74	3937978.45	Yes	777.10	777.07	-0.03	777.02	777.07	777.07
3152	489378.63	3928658.29	Yes	494.35	494.33	-0.02	494.32	494.44	494.46
3116	485231.50	3966370.91	Yes	593.25	593.23	-0.02	593.20	593.22	593.29
3115	490790.90	3966367.23	Yes	602.25	602.23	-0.02	602.22	602.22	602.25
3101	459364.43	3932792.92	Yes	584.65	584.63	-0.02	584.54	584.59	584.68
3091	467443.32	3939906.79	Yes	568.25	568.23	-0.02	568.19	568.24	568.26
3036	438115.77	3924035.00	Yes	683.35	683.33	-0.02	683.28	683.33	683.34
3135	478797.20	3940690.26	Yes	511.50	511.49	-0.01	511.48	511.50	511.50
3125	489996.20	3956734.59	Yes	558.95	558.94	-0.01	558.92	558.95	558.96
3073	448911.14	3942433.20	Yes	577.50	577.49	-0.01	577.44	577.50	577.55
3151	484587.05	3932703.72	Yes	484.35	484.35	0.00	484.26	484.29	484.36
3134	482722.20	3943088.00	Yes	531.90	531.90	0.00	531.88	531.88	531.92
3126	484528.77	3956729.61	Yes	545.45	545.45	0.00	545.39	545.40	545.47
3108	473361.13	3930606.25	Yes	579.95	579.95	0.00	579.94	579.98	580.00
3070	449364.18	3928917.04	Yes	587.30	587.30	0.00	587.23	587.34	587.39
3069	454365.99	3929920.76	Yes	612.30	612.30	0.00	612.28	612.30	612.31
3060	454899.22	3971235.73	Yes	670.00	670.00	0.00	669.99	670.00	670.03
3041	438631.19	3939280.00	Yes	603.40	603.40	0.00	603.32	603.32	603.43
3128	479545.20	3951937.32	Yes	563.10	563.11	0.01	563.08	563.13	563.15
3117	479282.58	3968010.50	Yes	594.75	594.76	0.01	594.72	594.75	594.78
3136	481897.59	3937364.94	Yes	508.85	508.87	0.02	508.86	508.86	508.89
3119	481994.59	3961574.93	Yes	551.00	551.02	0.02	551.01	551.02	551.11
3118	477198.09	3962971.20	Yes	562.30	562.32	0.02	562.27	562.31	562.38
3103	455739.70	3923160.93	Yes	672.30	672.32	0.02	672.26	672.29	672.34
3095	482953.09	3920606.36	Yes	530.25	530.27	0.02	530.24	530.26	530.30
3076	473913.09	3946321.86	Yes	516.90	516.92	0.02	516.87	516.90	516.95
3172	494201.52	3931788.21	Yes	500.40	500.43	0.03	500.41	500.43	500.44
3111	472557.73	3924694.36	Yes	572.65	572.68	0.03	572.67	572.68	572.71

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3066	456358.16	3945617.93	Yes	560.80	560.83	<b>0.03</b>	560.80	560.82	560.86
3227	493439.78	3874779.29	Yes	473.20	473.24	<b>0.04</b>	473.21	473.24	473.26
3099	470692.75	3935883.07	Yes	554.90	554.94	<b>0.04</b>	554.82	554.86	555.02
3195	492547.31	3904098.16	Yes	553.00	553.05	<b>0.05</b>	553.00	553.05	553.09
3133	480315.97	3946303.38	Yes	551.85	551.91	<b>0.06</b>	551.89	551.91	551.93
3132	485883.18	3945474.50	Yes	530.95	531.01	<b>0.06</b>	530.97	530.97	531.03
3192	487747.79	3911752.73	Yes	543.65	543.72	<b>0.07</b>	543.68	543.72	543.72
3137	486741.69	3940246.64	Yes	542.35	542.42	<b>0.07</b>	542.40	542.45	542.46
3038	444359.95	3930851.53	Yes	641.20	641.27	<b>0.07</b>	641.23	641.30	641.31
3196	492561.23	3909859.24	Yes	511.75	511.83	<b>0.08</b>	511.73	511.84	511.87
3149	494771.13	3936631.64	Yes	489.70	489.78	<b>0.08</b>	489.66	489.81	489.90
3086	467324.00	3956789.50	Yes	539.75	539.84	<b>0.09</b>	539.82	539.85	539.85
3131	491561.19	3946963.95	Yes	508.40	508.50	<b>0.10</b>	508.45	508.47	508.51
3087	467579.79	3951490.45	Yes	525.35	525.45	<b>0.10</b>	525.35	525.41	525.50
3037	444234.11	3926078.45	Yes	618.65	618.75	<b>0.10</b>	618.65	618.74	618.81
3092	461017.55	3938818.71	Yes	542.10	542.21	<b>0.11</b>	542.10	542.22	542.26
3150	489944.81	3935021.46	Yes	517.70	517.83	<b>0.13</b>	517.77	517.83	517.84

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**NRCS Oklahoma Dam Rehab  
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**Post-filter Control Report for Area 2**

**Project File: Area 2**  
**Project Unit: Meter**  
**Date: Friday: February 19: 2010**  
**Vertical Accuracy Objective**  
**Requirement Type: Accuracy(z)**  
**Accuracy(z) Objective: 0.36**  
**Confidence Level: 95%**  
**Control Points in Report: 521**  
**Elevation Calculation Method: Interpolated from TIN**  
**Control Points with LiDAR Coverage: 84**  
**Control Points with Required Accuracy ( 0.36): 84**  
**Percent of Control Points with Required Accuracy ( 0.36): 100.00**  
**Average Control Error Reported: -0.01**  
**Maximum (highest) Control Error Reported: 0.2**  
**Median Control Error Reported: 0.00**  
**Minimum (lowest) Control Error Reported: -0.28**  
**Standard deviation (sigma) of Z for sample: 0.11**  
**RMSE of Z for sample ( RMSE(z) ): 0.11: PASS**  
**FGDC/NSSDA Vertical Accuracy ( Accuracy(z) ): 0.22: PASS**  
**NSSDA Achievable Contour Interval: 0.4**  
**ASPRS Class 1 Achievable Contour Interval: 0.4**  
**NMAS Achievable Contour Interval: 0.4**

Control	Control Pt.	Control Pt.	Cover	Control Pt.	from LiDAR	Z Error	Min Z	Median Z	Max Z
Point Id	X(East)	Y(North)		Z(Elev)	Z(Elev)				
	Meters	Meters		Meters	Meters	Meters	Meters	Meters	Meters
3248	530315.72	3861871.82	Yes	507.55	507.27	-0.28	507.12	507.21	507.33
3253	515378.84	3869909.39	Yes	430.40	430.14	-0.26	430.07	430.10	430.17
3226	497685.65	3870787.14	Yes	462.75	462.51	-0.24	462.46	462.48	462.61
3225	532624.13	3906152.83	Yes	447.70	447.46	-0.24	447.37	447.53	447.54
3244	519477.62	3859797.29	Yes	484.45	484.26	-0.19	484.24	484.27	484.28
3234	508903.74	3882723.35	Yes	456.75	456.56	-0.19	456.53	456.55	456.57
3246	527975.82	3856168.13	Yes	529.50	529.33	-0.17	529.27	529.35	529.41
3231	509234.40	3887661.05	Yes	477.55	477.38	-0.17	477.35	477.43	477.44
3200	515249.50	3895715.69	Yes	457.85	457.69	-0.16	457.69	457.69	457.71
3160	529384.20	3918179.34	Yes	501.35	501.19	-0.16	501.17	501.19	501.27
3237	503351.08	3869926.80	Yes	440.85	440.70	-0.15	440.67	440.68	440.74
3247	525102.43	3860275.84	Yes	481.30	481.16	-0.14	481.16	481.16	481.21
3254	520212.97	3865086.56	Yes	449.95	449.82	-0.13	449.77	449.81	449.82

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3250	533050.52	3871550.51	Yes	441.10	440.97	<b>-0.13</b>	440.89	440.97	441.03
3220	532615.22	3911741.94	Yes	463.35	463.23	<b>-0.12</b>	463.22	463.25	463.38
3249	532432.33	3866720.83	Yes	485.00	484.89	<b>-0.11</b>	484.85	484.90	484.90
3238	508951.46	3869920.44	Yes	427.15	427.04	<b>-0.11</b>	427.03	427.04	427.04
3243	513799.15	3857831.34	Yes	478.70	478.60	<b>-0.10</b>	478.52	478.56	478.63
3233	503243.98	3882744.07	Yes	488.25	488.16	<b>-0.09</b>	488.10	488.17	488.20
3224	526207.81	3906134.89	Yes	480.20	480.11	<b>-0.09</b>	480.10	480.12	480.13
3161	530193.73	3924597.04	Yes	546.00	545.91	<b>-0.09</b>	545.91	545.92	545.93
3252	521792.43	3871534.44	Yes	438.10	438.02	<b>-0.08</b>	438.01	438.02	438.04
3228	497649.05	3876292.81	Yes	468.25	468.17	<b>-0.08</b>	468.14	468.18	468.20
3242	502530.96	3864287.40	Yes	459.35	459.28	<b>-0.07</b>	459.26	459.27	459.35
3184	497670.96	3893223.73	Yes	522.10	522.03	<b>-0.07</b>	522.00	522.01	522.05
3232	503305.44	3887577.65	Yes	477.05	476.99	<b>-0.06</b>	476.97	476.98	477.01
3211	526213.48	3900536.22	Yes	445.00	444.94	<b>-0.06</b>	444.91	444.95	444.98
3272	528158.87	3877143.85	Yes	431.65	431.60	<b>-0.05</b>	431.58	431.60	431.61
3230	497656.55	3887574.59	Yes	511.45	511.40	<b>-0.05</b>	511.36	511.40	511.43
3223	521406.69	3907740.36	Yes	470.30	470.25	<b>-0.05</b>	470.21	470.22	470.26
3241	513787.77	3863476.25	Yes	449.85	449.81	<b>-0.04</b>	449.79	449.81	449.83
3235	508702.43	3876300.67	Yes	441.15	441.12	<b>-0.03</b>	441.08	441.20	441.23
3180	510191.98	3904543.46	Yes	467.65	467.62	<b>-0.03</b>	467.59	467.63	467.64
3123	500164.49	3955094.58	Yes	563.60	563.57	<b>-0.03</b>	563.55	563.57	563.57
3276	520887.11	3882753.04	Yes	423.40	423.38	<b>-0.02</b>	423.38	423.40	423.41
3271	534587.47	3877155.71	Yes	424.60	424.58	<b>-0.02</b>	424.53	424.56	424.60
3218	535729.50	3923807.03	Yes	507.05	507.03	<b>-0.02</b>	506.99	507.00	507.08
3177	515006.26	3913003.33	Yes	448.30	448.28	<b>-0.02</b>	448.24	448.25	448.30
3212	531822.76	3900550.31	Yes	479.30	479.29	<b>-0.01</b>	479.26	479.27	479.31
3210	522208.49	3902127.55	Yes	463.90	463.89	<b>-0.01</b>	463.88	463.92	463.95
3207	531571.57	3894939.72	Yes	455.45	455.44	<b>-0.01</b>	455.39	455.46	455.47
3204	532374.77	3889318.62	Yes	434.35	434.34	<b>-0.01</b>	434.33	434.33	434.36
3222	520586.71	3913379.17	Yes	487.10	487.11	<b>0.01</b>	487.11	487.12	487.12
3199	515012.39	3901112.60	Yes	451.85	451.86	<b>0.01</b>	451.82	451.83	451.94
3183	504103.59	3893220.22	Yes	492.35	492.37	<b>0.02</b>	492.37	492.37	492.38
3171	499762.47	3932652.92	Yes	457.65	457.67	<b>0.02</b>	457.58	457.69	457.71
3167	518129.31	3929419.96	Yes	523.80	523.82	<b>0.02</b>	523.81	523.81	523.83
3273	521751.42	3877127.42	Yes	412.50	412.53	<b>0.03</b>	412.50	412.51	412.58
3229	497639.01	3882089.43	Yes	509.55	509.58	<b>0.03</b>	509.54	509.56	509.59
3219	535017.78	3918174.94	Yes	471.70	471.73	<b>0.03</b>	471.70	471.74	471.78
3181	509646.73	3898920.50	Yes	469.45	469.48	<b>0.03</b>	469.45	469.47	469.51
3146	497993.84	3950294.23	Yes	538.80	538.83	<b>0.03</b>	538.78	538.85	538.86
3277	526539.40	3882768.31	Yes	414.60	414.64	<b>0.04</b>	414.59	414.62	414.71

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3202	521212.45	3890902.67	Yes	424.15	424.19	<b>0.04</b>	424.18	424.20	424.21
3201	515516.38	3889280.26	Yes	440.80	440.84	<b>0.04</b>	440.79	440.86	440.88
3141	509222.66	3940655.22	Yes	521.65	521.69	<b>0.04</b>	521.67	521.71	521.74
3163	518946.76	3923022.91	Yes	515.70	515.75	<b>0.05</b>	515.65	515.69	515.78
3147	504410.77	3947082.72	Yes	524.90	524.95	<b>0.05</b>	524.91	524.94	524.96
3139	498785.08	3943857.96	Yes	524.85	524.91	<b>0.06</b>	524.79	524.90	524.91
3275	515327.70	3882740.39	Yes	444.85	444.92	<b>0.07</b>	444.88	444.93	444.96
3209	521433.29	3896212.76	Yes	440.30	440.37	<b>0.07</b>	440.31	440.36	440.39
3175	505398.12	3931041.34	Yes	477.10	477.17	<b>0.07</b>	477.16	477.18	477.23
3174	500829.02	3926935.33	Yes	494.75	494.82	<b>0.07</b>	494.77	494.85	494.86
3170	504420.45	3936660.60	Yes	489.60	489.67	<b>0.07</b>	489.62	489.67	489.68
3166	511768.88	3929434.29	Yes	509.70	509.77	<b>0.07</b>	509.75	509.79	509.79
3203	526763.65	3889304.59	Yes	443.20	443.28	<b>0.08</b>	443.18	443.29	443.32
3122	498358.28	3959922.52	Yes	568.40	568.48	<b>0.08</b>	568.43	568.49	568.51
3278	520393.72	3885983.26	Yes	412.05	412.14	<b>0.09</b>	412.12	412.13	412.21
3185	498140.66	3898912.76	Yes	486.45	486.55	<b>0.10</b>	486.50	486.55	486.56
3168	517303.75	3935875.22	Yes	525.50	525.60	<b>0.10</b>	525.57	525.60	525.61
3157	511870.06	3918186.72	Yes	437.85	437.95	<b>0.10</b>	437.91	437.95	437.96
3114	497994.52	3965331.12	Yes	550.95	551.06	<b>0.11</b>	550.88	551.02	551.12
3144	509206.30	3951893.50	Yes	545.30	545.42	<b>0.12</b>	545.41	545.42	545.49
3155	499767.25	3921421.01	Yes	508.50	508.63	<b>0.13</b>	508.54	508.58	508.67
3197	498151.77	3910166.93	Yes	520.35	520.49	<b>0.14</b>	520.46	520.49	520.52
3148	499608.14	3938021.89	Yes	510.55	510.69	<b>0.14</b>	510.66	510.67	510.73
3178	506945.86	3914987.85	Yes	466.10	466.25	<b>0.15</b>	466.23	466.26	466.26
3159	523532.78	3918176.45	Yes	511.35	511.50	<b>0.15</b>	511.45	511.51	511.68
3198	497336.30	3904547.99	Yes	498.60	498.76	<b>0.16</b>	498.69	498.74	498.79
3189	500565.71	3915686.27	Yes	466.90	467.06	<b>0.16</b>	467.00	467.01	467.07
3187	503760.60	3904535.01	Yes	469.45	469.62	<b>0.17</b>	469.59	469.60	469.65
3164	513368.01	3923858.29	Yes	474.30	474.49	<b>0.19</b>	474.47	474.47	474.51
3156	505390.67	3919009.77	Yes	479.50	479.69	<b>0.19</b>	479.64	479.69	479.72
3179	509383.90	3910171.36	Yes	441.55	441.75	<b>0.20</b>	441.69	441.74	441.79

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

**Post-filter Control Report for Area 3**

**Project File: Area 3**  
**Project Unit: Meter**  
**Date: Wednesday: March 17: 2010**  
**Vertical Accuracy Objective**  
**Requirement Type: Accuracy(z)**  
**Accuracy(z) Objective: 0.36**  
**Confidence Level: 95%**  
**Control Points in Report: 521**  
**Elevation Calculation Method: Interpolated from TIN**  
**Control Points with LiDAR Coverage: 259**  
**Control Points with Required Accuracy (+/- 0.36): 259**  
**Percent of Control Points with Required Accuracy (+/- 0.36): 100.00**  
**Average Control Error Reported: 0.01**  
**Maximum (highest) Control Error Reported: 0.24**  
**Median Control Error Reported: 0.01**  
**Minimum (lowest) Control Error Reported: -0.25**  
**Standard deviation (sigma) of Z for sample: 0.09**  
**RMSE of Z for sample ( RMSE(z) ): 0.09: PASS**  
**FGDC/NSSDA Vertical Accuracy ( Accuracy(z) ): 0.17: PASS**  
**NSSDA Achievable Contour Interval: 0.3**  
**ASPRS Class 1 Achievable Contour Interval: 0.3**  
**NMAS Achievable Contour Interval: 0.3**

Control Point Id	Control Pt. X(East) Meters	Control Pt. Y(North) Meters	Coverage	Control Pt. Z(Elev) Meters	from LiDAR Z(Elev) Meters	Z Error Meters	Min Z Meters	Median Z Meters	Max Z Meters
3533	652741.98	3825246.32	Yes	284.45	284.20	-0.25	284.11	284.25	284.27
3300	567806.35	3908753.99	Yes	418.60	418.39	-0.21	418.35	418.39	418.43
3422	644688.18	3871035.53	Yes	349.25	349.05	-0.20	349.02	349.05	349.05
3556	688456.64	3803134.40	Yes	281.65	281.49	-0.16	281.45	281.61	281.71
3469	624013.84	3812749.22	Yes	329.30	329.14	-0.16	329.10	329.15	329.18
3413	612532.57	3820680.37	Yes	318.80	318.64	-0.16	318.63	318.65	318.69
3411	617248.76	3830400.69	Yes	364.45	364.29	-0.16	364.27	364.30	364.32
3461	628542.53	3847008.40	Yes	365.10	364.95	-0.15	364.86	364.97	365.02
3416	606810.54	3825837.06	Yes	336.85	336.70	-0.15	336.66	336.71	336.77
3421	601510.38	3835066.66	Yes	390.50	390.36	-0.14	390.30	390.35	390.42
3412	617324.34	3824696.96	Yes	368.45	368.31	-0.14	368.29	368.32	368.35
3423	639058.71	3870138.39	Yes	330.05	329.92	-0.13	329.80	329.92	329.93
3418	612399.05	3832554.31	Yes	373.05	372.92	-0.13	372.87	372.93	373.03

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3402	615322.33	3854255.19	Yes	343.85	343.72	<b>-0.13</b>	343.62	343.70	343.73
3490	679829.38	3836821.69	Yes	328.55	328.43	<b>-0.12</b>	328.38	328.48	328.53
3395	595926.17	3829583.24	Yes	393.10	392.98	<b>-0.12</b>	392.97	392.98	393.08
3294	558223.69	3911078.65	Yes	409.35	409.23	<b>-0.12</b>	409.17	409.27	409.28
3503	650297.63	3835686.43	Yes	310.45	310.34	<b>-0.11</b>	310.34	310.34	310.43
3440	627031.87	3870774.37	Yes	334.45	334.34	<b>-0.11</b>	334.33	334.35	334.46
3394	595539.44	3834452.56	Yes	399.10	398.99	<b>-0.11</b>	398.98	399.01	399.02
3302	573407.94	3909609.65	Yes	477.70	477.59	<b>-0.11</b>	477.47	477.62	477.67
3269	537756.76	3884402.19	Yes	421.30	421.19	<b>-0.11</b>	421.12	421.18	421.21
3551	673672.43	3825608.13	Yes	297.25	297.15	<b>-0.10</b>	297.11	297.12	297.20
3539	680940.97	3820128.25	Yes	281.50	281.40	<b>-0.10</b>	281.37	281.39	281.49
3537	670105.56	3819781.80	Yes	245.90	245.80	<b>-0.10</b>	245.75	245.80	245.86
3408	607497.47	3837822.89	Yes	379.75	379.65	<b>-0.10</b>	379.60	379.65	379.69
3406	611832.53	3843230.41	Yes	371.10	371.00	<b>-0.10</b>	370.93	370.99	371.04
3405	619213.34	3841576.76	Yes	336.55	336.45	<b>-0.10</b>	336.35	336.45	336.46
3350	608218.98	3893833.02	Yes	386.00	385.90	<b>-0.10</b>	385.85	385.93	385.95
3293	561371.47	3907340.57	Yes	417.70	417.60	<b>-0.10</b>	417.58	417.59	417.67
3513	644429.36	3841633.69	Yes	328.10	328.01	<b>-0.09</b>	327.94	328.06	328.06
3414	607021.85	3820779.74	Yes	347.10	347.01	<b>-0.09</b>	346.98	346.99	347.03
3410	618801.21	3835201.34	Yes	348.55	348.46	<b>-0.09</b>	348.44	348.46	348.57
3391	576372.47	3852467.05	Yes	409.05	408.96	<b>-0.09</b>	408.86	408.93	409.06
3299	563788.25	3911915.23	Yes	473.80	473.71	<b>-0.09</b>	473.65	473.71	473.71
3265	545802.07	3880427.55	Yes	425.85	425.76	<b>-0.09</b>	425.72	425.73	425.78
3553	688218.78	3815337.72	Yes	335.05	334.97	<b>-0.08</b>	334.94	334.97	335.03
3464	645936.59	3847773.68	Yes	297.70	297.62	<b>-0.08</b>	297.60	297.65	297.71
3429	631116.76	3863327.76	Yes	333.60	333.52	<b>-0.08</b>	333.50	333.51	333.54
3399	600679.92	3847958.74	Yes	395.90	395.82	<b>-0.08</b>	395.74	395.78	395.93
3263	551407.46	3883250.92	Yes	381.60	381.52	<b>-0.08</b>	381.49	381.53	381.59
3217	541344.15	3923007.30	Yes	518.60	518.52	<b>-0.08</b>	518.48	518.52	518.54
3585	671686.79	3797402.16	Yes	258.40	258.33	<b>-0.07</b>	258.32	258.32	258.34
3552	681840.91	3813719.49	Yes	283.70	283.63	<b>-0.07</b>	283.60	283.62	283.68
3488	686093.12	3844310.70	Yes	346.30	346.23	<b>-0.07</b>	346.21	346.25	346.25
3321	563536.07	3870061.76	Yes	429.00	428.93	<b>-0.07</b>	428.91	428.93	428.96
3542	688107.38	3827448.73	Yes	325.10	325.04	<b>-0.06</b>	324.99	325.03	325.06
3470	628840.36	3812806.44	Yes	297.35	297.29	<b>-0.06</b>	297.04	297.28	297.42
3426	645666.45	3859029.45	Yes	297.75	297.69	<b>-0.06</b>	297.60	297.70	297.70
3419	606437.49	3831892.08	Yes	371.30	371.24	<b>-0.06</b>	371.17	371.27	371.33
3288	550137.31	3925442.67	Yes	504.65	504.59	<b>-0.06</b>	504.57	504.59	504.60
3282	561496.68	3901480.35	Yes	441.75	441.69	<b>-0.06</b>	441.68	441.68	441.71
3257	548687.68	3899817.22	Yes	416.00	415.94	<b>-0.06</b>	415.91	416.00	416.05

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3538	675317.98	3819997.77	Yes	278.55	278.50	-0.05	278.43	278.45	278.57
3502	655748.65	3836574.65	Yes	316.40	316.35	-0.05	316.32	316.35	316.39
3458	638269.90	3853285.61	Yes	291.15	291.10	-0.05	291.07	291.11	291.16
3447	657382.21	3864780.98	Yes	334.55	334.50	-0.05	334.44	334.47	334.56
3320	563499.81	3875683.85	Yes	426.45	426.40	-0.05	426.33	426.37	426.41
3312	569256.53	3870075.13	Yes	428.85	428.80	-0.05	428.77	428.80	428.90
3291	551820.69	3909444.01	Yes	460.35	460.30	-0.05	460.29	460.30	460.38
3287	545338.02	3920649.54	Yes	495.40	495.35	-0.05	495.32	495.33	495.37
3540	686459.42	3821764.51	Yes	299.70	299.66	-0.04	299.66	299.66	299.67
3501	661477.49	3835830.98	Yes	281.10	281.06	-0.04	281.02	281.06	281.09
3495	676413.80	3846556.90	Yes	293.80	293.76	-0.04	293.76	293.77	293.77
3466	623232.27	3819199.58	Yes	327.70	327.66	-0.04	327.63	327.66	327.69
3404	617173.12	3846509.04	Yes	392.25	392.21	-0.04	392.17	392.19	392.29
3403	612387.39	3848082.08	Yes	387.10	387.06	-0.04	387.04	387.10	387.11
3400	601087.91	3841513.05	Yes	427.30	427.26	-0.04	427.25	427.26	427.28
3390	574864.08	3858005.05	Yes	391.25	391.21	-0.04	391.19	391.19	391.26
3298	562989.75	3917463.42	Yes	492.10	492.06	-0.04	491.98	492.04	492.09
3290	551818.71	3915041.01	Yes	493.25	493.21	-0.04	493.19	493.19	493.26
3605	672605.82	3791852.19	Yes	226.40	226.37	-0.03	226.35	226.36	226.39
3554	686102.49	3809817.25	Yes	283.55	283.52	-0.03	283.44	283.49	283.54
3546	681767.07	3825712.22	Yes	306.40	306.37	-0.03	306.30	306.36	306.38
3494	673752.85	3840865.78	Yes	289.25	289.22	-0.03	289.18	289.19	289.31
3477	630806.46	3841434.34	Yes	316.40	316.37	-0.03	316.31	316.35	316.39
3465	617767.67	3819130.91	Yes	333.45	333.42	-0.03	333.37	333.41	333.44
3455	652100.84	3859664.27	Yes	322.65	322.62	-0.03	322.58	322.62	322.65
3397	592311.79	3849487.32	Yes	425.65	425.62	-0.03	425.56	425.62	425.63
3319	563623.61	3881463.28	Yes	389.70	389.67	-0.03	389.67	389.67	389.68
3309	574626.69	3880563.83	Yes	380.65	380.62	-0.03	380.41	380.63	380.63
3264	551438.16	3878030.78	Yes	411.00	410.97	-0.03	410.90	410.94	410.98
2028	676129.96	3809438.23	Yes	243.50	243.47	-0.03	243.44	243.50	243.52
3594	689249.83	3792079.43	Yes	213.20	213.18	-0.02	213.15	213.19	213.22
3588	670452.53	3803038.30	Yes	292.65	292.63	-0.02	292.59	292.59	292.66
3504	644515.81	3836606.83	Yes	317.25	317.23	-0.02	317.21	317.23	317.27
3482	622884.52	3830468.88	Yes	335.15	335.13	-0.02	335.11	335.14	335.16
3476	630078.46	3836475.09	Yes	362.15	362.13	-0.02	362.11	362.12	362.14
3471	628933.59	3807072.49	Yes	341.25	341.23	-0.02	341.21	341.21	341.26
3436	616604.49	3864738.45	Yes	326.85	326.83	-0.02	326.82	326.83	326.83
3407	606445.89	3843177.40	Yes	385.60	385.58	-0.02	385.55	385.56	385.59
3393	568435.07	3858839.25	Yes	424.90	424.88	-0.02	424.85	424.87	424.99
3305	564703.78	3897493.92	Yes	379.25	379.23	-0.02	379.21	379.21	379.35



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3283	555094.51	3899852.57	Yes	461.70	461.68	-0.02	461.67	461.68	461.70
3268	540172.30	3879600.36	Yes	444.35	444.33	-0.02	444.26	444.33	444.37
3582	659971.47	3790749.37	Yes	273.25	273.24	-0.01	273.16	273.23	273.27
3578	654325.24	3791482.72	Yes	302.35	302.34	-0.01	302.34	302.34	302.40
3574	665636.77	3808306.51	Yes	366.80	366.79	-0.01	366.76	366.82	366.91
3462	633999.70	3845595.54	Yes	319.50	319.49	-0.01	319.46	319.46	319.58
3456	649838.91	3853390.52	Yes	284.15	284.14	-0.01	284.07	284.11	284.18
3415	602016.06	3824668.86	Yes	365.95	365.94	-0.01	365.84	365.94	366.01
3325	557187.18	3888708.74	Yes	421.10	421.09	-0.01	421.00	421.09	421.13
3322	557117.36	3871646.65	Yes	423.60	423.59	-0.01	423.57	423.63	423.63
3315	567218.95	3886294.54	Yes	416.20	416.19	-0.01	416.13	416.22	416.27
3296	558166.67	3922301.33	Yes	474.70	474.69	-0.01	474.68	474.69	474.72
3214	539034.73	3906166.74	Yes	450.05	450.04	-0.01	450.00	450.05	450.06
3586	666063.27	3797295.29	Yes	247.55	247.55	0.00	247.52	247.56	247.59
3569	653128.66	3812541.94	Yes	390.80	390.80	0.00	390.77	390.79	390.81
3547	680737.91	3831331.53	Yes	330.00	330.00	0.00	330.00	330.02	330.02
3534	652836.88	3819614.38	Yes	291.50	291.50	0.00	291.44	291.50	291.50
3532	658487.15	3825219.11	Yes	285.55	285.55	0.00	285.46	285.51	285.58
3511	663967.90	3830629.42	Yes	268.60	268.60	0.00	268.56	268.58	268.61
3499	651562.17	3846976.58	Yes	307.95	307.95	0.00	307.86	307.94	307.99
3444	632623.88	3869222.85	Yes	343.65	343.65	0.00	343.65	343.66	343.66
3389	574821.79	3863700.10	Yes	429.80	429.80	0.00	429.78	429.80	429.81
3280	572681.04	3903164.41	Yes	440.85	440.85	0.00	440.80	440.86	440.87
3262	542270.24	3898567.37	Yes	413.90	413.90	0.00	413.88	413.89	414.10
3259	550784.29	3888598.73	Yes	397.75	397.75	0.00	397.75	397.76	397.81
3256	543856.56	3902997.69	Yes	443.90	443.90	0.00	443.83	443.89	443.91
3205	537973.56	3890953.82	Yes	443.00	443.00	0.00	442.98	442.99	443.01
3548	675113.61	3831233.70	Yes	306.50	306.51	0.01	306.45	306.47	306.63
3521	646535.01	3813766.98	Yes	330.50	330.51	0.01	330.49	330.52	330.54
3514	638833.54	3841816.80	Yes	337.40	337.41	0.01	337.41	337.41	337.43
3507	639796.75	3830691.11	Yes	316.75	316.76	0.01	316.71	316.79	316.80
3493	667842.17	3841380.40	Yes	268.90	268.91	0.01	268.86	268.92	268.95
3481	625250.22	3836163.93	Yes	360.25	360.26	0.01	360.20	360.25	360.31
3468	618407.84	3812686.02	Yes	330.05	330.06	0.01	329.98	330.07	330.11
3451	666686.65	3852022.42	Yes	302.60	302.61	0.01	302.57	302.63	302.64
3448	663290.95	3863275.03	Yes	326.20	326.21	0.01	326.17	326.25	326.27
3438	621392.94	3868408.97	Yes	366.90	366.91	0.01	366.83	366.97	366.98
3398	586506.61	3849356.01	Yes	416.75	416.76	0.01	416.69	416.74	416.77
3311	574792.15	3869314.91	Yes	412.15	412.16	0.01	412.15	412.18	412.21
3516	634398.46	3819350.18	Yes	308.00	308.02	0.02	307.94	308.03	308.06

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3505	637305.35	3836741.16	Yes	387.60	387.62	<b>0.02</b>	387.57	387.59	387.71
3487	681194.77	3847457.72	Yes	302.65	302.67	<b>0.02</b>	302.65	302.65	302.68
3484	674579.55	3856969.88	Yes	296.25	296.27	<b>0.02</b>	296.22	296.25	296.28
3474	628615.55	3824926.95	Yes	342.05	342.07	<b>0.02</b>	342.05	342.06	342.11
3473	622682.94	3824894.94	Yes	331.15	331.17	<b>0.02</b>	331.09	331.17	331.19
3460	626026.02	3851255.23	Yes	304.20	304.22	<b>0.02</b>	304.22	304.23	304.28
3430	627942.30	3858567.91	Yes	300.30	300.32	<b>0.02</b>	300.26	300.35	300.36
3396	595381.50	3844677.16	Yes	406.00	406.02	<b>0.02</b>	405.93	405.98	406.07
3371	586473.28	3854996.60	Yes	360.05	360.07	<b>0.02</b>	360.03	360.05	360.11
3357	598777.83	3875854.46	Yes	329.10	329.12	<b>0.02</b>	329.11	329.11	329.16
3323	557056.90	3877252.63	Yes	421.50	421.52	<b>0.02</b>	421.51	421.53	421.53
3317	561968.45	3891093.08	Yes	447.80	447.82	<b>0.02</b>	447.78	447.81	447.92
3589	670789.67	3814071.16	Yes	251.00	251.03	<b>0.03</b>	251.02	251.02	251.11
3572	660412.81	3807461.47	Yes	401.35	401.38	<b>0.03</b>	401.26	401.36	401.42
3570	665449.19	3813843.96	Yes	368.80	368.83	<b>0.03</b>	368.82	368.84	368.88
3531	663990.52	3825011.67	Yes	250.30	250.33	<b>0.03</b>	250.26	250.32	250.33
3483	669041.15	3856878.36	Yes	296.25	296.28	<b>0.03</b>	296.26	296.28	296.30
3457	643470.46	3853294.74	Yes	310.15	310.18	<b>0.03</b>	310.11	310.21	310.21
3435	608496.85	3870526.42	Yes	318.70	318.73	<b>0.03</b>	318.68	318.72	318.73
3434	610158.14	3865701.88	Yes	313.85	313.88	<b>0.03</b>	313.85	313.88	313.91
3327	588716.40	3904104.03	Yes	443.60	443.63	<b>0.03</b>	443.51	443.63	443.70
3593	690156.78	3796933.40	Yes	253.85	253.89	<b>0.04</b>	253.85	253.85	253.90
3577	654027.68	3797084.54	Yes	272.40	272.44	<b>0.04</b>	272.43	272.44	272.49
3549	669458.44	3831137.81	Yes	259.20	259.24	<b>0.04</b>	259.15	259.18	259.24
3496	670000.77	3847230.48	Yes	288.05	288.09	<b>0.04</b>	288.07	288.10	288.14
3475	628542.72	3830530.05	Yes	348.70	348.74	<b>0.04</b>	348.68	348.69	348.77
3463	639550.94	3847446.41	Yes	298.85	298.89	<b>0.04</b>	298.87	298.89	298.91
3454	657604.59	3858344.65	Yes	302.60	302.64	<b>0.04</b>	302.60	302.66	302.66
3453	655441.93	3852968.45	Yes	287.70	287.74	<b>0.04</b>	287.72	287.78	287.81
3380	597292.05	3864765.33	Yes	362.60	362.64	<b>0.04</b>	362.61	362.61	362.69
3364	598735.44	3881696.74	Yes	344.80	344.84	<b>0.04</b>	344.81	344.89	344.89
3316	567765.07	3892718.18	Yes	369.65	369.69	<b>0.04</b>	369.66	369.69	369.72
3306	570425.90	3897527.87	Yes	452.70	452.74	<b>0.04</b>	452.66	452.74	452.76
3258	549234.44	3894236.70	Yes	413.40	413.44	<b>0.04</b>	413.41	413.41	413.48
3215	538210.21	3911790.31	Yes	475.60	475.64	<b>0.04</b>	475.61	475.66	475.67
3555	683654.54	3804546.72	Yes	292.90	292.95	<b>0.05</b>	292.92	292.94	292.98
3510	657471.51	3830955.48	Yes	309.05	309.10	<b>0.05</b>	309.07	309.13	309.14
3500	656456.22	3842228.06	Yes	295.85	295.90	<b>0.05</b>	295.87	295.92	295.95
3479	622864.10	3846437.99	Yes	339.15	339.20	<b>0.05</b>	339.19	339.20	339.21
3360	617275.45	3875471.24	Yes	367.65	367.70	<b>0.05</b>	367.67	367.67	367.80

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3308	573201.27	3886322.74	Yes	357.90	357.95	<b>0.05</b>	357.88	357.95	357.95
3284	549809.34	3905420.33	Yes	465.40	465.45	<b>0.05</b>	465.33	465.36	465.51
3603	679132.22	3786433.36	Yes	242.50	242.56	<b>0.06</b>	242.55	242.55	242.57
3587	666865.17	3802248.08	Yes	298.10	298.16	<b>0.06</b>	298.11	298.15	298.17
3581	665355.24	3791847.35	Yes	267.80	267.86	<b>0.06</b>	267.79	267.84	267.93
3579	660670.70	3785925.35	Yes	286.50	286.56	<b>0.06</b>	286.53	286.57	286.62
3450	660926.69	3851949.93	Yes	273.35	273.41	<b>0.06</b>	273.36	273.40	273.46
3428	633592.21	3857952.69	Yes	300.65	300.71	<b>0.06</b>	300.64	300.71	300.76
3385	597223.80	3870377.99	Yes	344.35	344.41	<b>0.06</b>	344.31	344.44	344.47
3604	671840.55	3786223.60	Yes	273.00	273.07	<b>0.07</b>	273.01	273.06	273.09
3576	654071.95	3802778.07	Yes	291.60	291.67	<b>0.07</b>	291.65	291.67	291.73
3523	648328.69	3802538.15	Yes	280.35	280.42	<b>0.07</b>	280.40	280.44	280.48
3515	634570.86	3812889.06	Yes	319.90	319.97	<b>0.07</b>	319.87	319.98	319.99
3508	646219.90	3830779.60	Yes	295.00	295.07	<b>0.07</b>	295.02	295.06	295.13
3478	625160.32	3841784.75	Yes	348.50	348.57	<b>0.07</b>	348.55	348.67	348.68
3366	586874.45	3871827.72	Yes	413.40	413.47	<b>0.07</b>	413.44	413.50	413.51
3365	592373.55	3872744.67	Yes	394.40	394.47	<b>0.07</b>	394.45	394.48	394.48
3362	611581.62	3881346.90	Yes	362.10	362.17	<b>0.07</b>	362.16	362.17	362.19
3313	569055.84	3874907.88	Yes	388.60	388.67	<b>0.07</b>	388.50	388.70	388.70
3528	641654.48	3818821.90	Yes	274.30	274.38	<b>0.08</b>	274.34	274.39	274.42
3518	640712.97	3824263.37	Yes	278.15	278.23	<b>0.08</b>	278.22	278.24	278.25
3498	657363.75	3847853.73	Yes	281.10	281.18	<b>0.08</b>	281.08	281.12	281.21
3491	673446.56	3834415.98	Yes	291.80	291.88	<b>0.08</b>	291.86	291.88	291.92
3431	622518.68	3856540.15	Yes	302.45	302.53	<b>0.08</b>	302.50	302.55	302.56
3382	587020.27	3860579.19	Yes	390.80	390.88	<b>0.08</b>	390.83	390.90	390.91
3353	601878.30	3887353.94	Yes	374.95	375.03	<b>0.08</b>	374.98	375.00	375.05
3348	610623.38	3899529.70	Yes	415.35	415.43	<b>0.08</b>	415.42	415.43	415.53
3261	544391.69	3892586.41	Yes	441.35	441.43	<b>0.08</b>	441.39	441.42	441.49
3575	659591.11	3801776.53	Yes	289.85	289.94	<b>0.09</b>	289.83	289.93	289.99
3571	658703.65	3813731.60	Yes	391.25	391.34	<b>0.09</b>	391.26	391.30	391.37
3485	680988.24	3857232.36	Yes	338.80	338.89	<b>0.09</b>	338.88	338.89	338.89
3386	602622.74	3871642.61	Yes	327.45	327.54	<b>0.09</b>	327.31	327.39	327.61
3351	602538.88	3893001.72	Yes	383.15	383.24	<b>0.09</b>	383.21	383.26	383.31
3342	591074.49	3894480.87	Yes	381.25	381.34	<b>0.09</b>	381.27	381.41	381.44
3338	587480.94	3883109.88	Yes	340.75	340.84	<b>0.09</b>	340.80	340.84	340.90
3286	545378.49	3914992.39	Yes	478.45	478.54	<b>0.09</b>	478.53	478.62	478.62
3452	673234.82	3852126.56	Yes	292.10	292.20	<b>0.10</b>	292.16	292.20	292.21
3441	622896.89	3875550.00	Yes	367.95	368.05	<b>0.10</b>	368.04	368.07	368.09
3432	623080.72	3861913.21	Yes	332.80	332.90	<b>0.10</b>	332.86	332.92	332.93
3425	642363.22	3864567.38	Yes	317.00	317.10	<b>0.10</b>	316.99	317.01	317.12

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3378	597344.71	3859095.95	Yes	385.25	385.35	<b>0.10</b>	385.33	385.35	385.46
3373	597700.60	3853486.43	Yes	413.00	413.10	<b>0.10</b>	413.10	413.11	413.18
3522	647441.54	3808223.65	Yes	310.20	310.31	<b>0.11</b>	310.26	310.29	310.33
3480	620331.19	3851387.85	Yes	328.20	328.31	<b>0.11</b>	328.22	328.30	328.33
3376	610226.24	3859760.30	Yes	345.00	345.11	<b>0.11</b>	345.08	345.16	345.17
3354	607453.64	3888227.73	Yes	353.95	354.06	<b>0.11</b>	354.00	354.02	354.11
3339	582034.53	3884742.14	Yes	347.15	347.26	<b>0.11</b>	347.24	347.25	347.28
3573	670890.41	3808504.58	Yes	371.00	371.12	<b>0.12</b>	371.09	371.09	371.18
3526	641999.18	3807376.91	Yes	315.75	315.87	<b>0.12</b>	315.77	315.89	315.98
3519	646317.50	3825153.35	Yes	276.15	276.27	<b>0.12</b>	276.23	276.26	276.28
3361	617397.20	3881188.69	Yes	392.90	393.02	<b>0.12</b>	392.97	393.01	393.05
3359	611654.64	3875210.76	Yes	361.55	361.67	<b>0.12</b>	361.66	361.67	361.70
3356	593115.53	3878412.83	Yes	354.05	354.17	<b>0.12</b>	354.15	354.17	354.18
3318	562003.25	3886263.62	Yes	399.95	400.07	<b>0.12</b>	400.06	400.08	400.10
3289	551772.66	3920372.73	Yes	462.40	462.52	<b>0.12</b>	462.37	462.55	462.57
3368	581249.28	3862530.56	Yes	419.25	419.38	<b>0.13</b>	419.32	419.36	419.40
3367	580570.81	3868559.39	Yes	446.60	446.73	<b>0.13</b>	446.71	446.71	446.77
3352	596977.78	3894553.39	Yes	348.35	348.48	<b>0.13</b>	348.48	348.49	348.51
3329	587177.02	3898513.56	Yes	372.15	372.28	<b>0.13</b>	372.19	372.25	372.31
3606	677403.29	3792134.61	Yes	228.80	228.94	<b>0.14</b>	228.85	228.94	229.03
3536	664374.72	3819338.36	Yes	296.40	296.54	<b>0.14</b>	296.47	296.52	296.56
3527	640099.18	3812975.05	Yes	314.20	314.34	<b>0.14</b>	314.34	314.34	314.36
3517	635320.42	3825105.03	Yes	307.65	307.79	<b>0.14</b>	307.75	307.78	307.84
3384	591763.74	3867956.67	Yes	346.30	346.44	<b>0.14</b>	346.43	346.44	346.51
3377	603783.25	3859942.33	Yes	353.15	353.29	<b>0.14</b>	353.28	353.28	353.31
3370	581716.56	3852796.36	Yes	406.50	406.64	<b>0.14</b>	406.60	406.63	406.67
3335	581090.09	3879823.29	Yes	389.70	389.84	<b>0.14</b>	389.79	389.83	389.94
3332	580396.33	3894376.22	Yes	403.10	403.24	<b>0.14</b>	403.19	403.28	403.30
3331	575950.80	3897570.06	Yes	421.70	421.84	<b>0.14</b>	421.83	421.85	421.87
3607	683240.29	3792364.17	Yes	254.95	255.10	<b>0.15</b>	255.03	255.14	255.15
3363	605131.24	3882550.13	Yes	346.35	346.50	<b>0.15</b>	346.37	346.50	346.52
3346	600034.66	3899401.23	Yes	374.80	374.95	<b>0.15</b>	374.93	374.94	374.97
3343	590370.74	3888028.45	Yes	362.50	362.65	<b>0.15</b>	362.57	362.68	362.69
3341	585907.03	3892824.29	Yes	373.85	374.00	<b>0.15</b>	373.93	373.95	374.01
3336	581146.88	3874163.02	Yes	383.60	383.75	<b>0.15</b>	383.71	383.74	383.82
3530	635407.08	3801630.91	Yes	333.00	333.16	<b>0.16</b>	333.09	333.17	333.18
3375	609851.34	3854484.43	Yes	337.90	338.06	<b>0.16</b>	338.03	338.03	338.10
3345	599975.63	3905022.46	Yes	395.80	395.96	<b>0.16</b>	395.94	395.96	395.98
3340	584374.70	3887181.26	Yes	342.70	342.86	<b>0.16</b>	342.84	342.85	342.88
3330	580781.04	3899217.15	Yes	428.95	429.12	<b>0.17</b>	429.09	429.17	429.24

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3381	592493.88	3860652.44	Yes	377.10	377.28	<b>0.18</b>	377.15	377.29	377.30
3213	537436.83	3900569.35	Yes	439.50	439.68	<b>0.18</b>	439.57	439.61	439.72
3333	579561.50	3889515.09	Yes	380.75	380.95	<b>0.20</b>	380.91	380.94	380.97
3326	583884.03	3904060.60	Yes	425.80	426.00	<b>0.20</b>	425.96	425.99	426.05
3525	642124.72	3801739.72	Yes	282.95	283.16	<b>0.21</b>	283.16	283.16	283.20
3304	560341.21	3895868.53	Yes	435.55	435.79	<b>0.24</b>	435.72	435.80	435.85

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**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

**Post-filter Control Report for Area 4**

**Project File: Area 4**  
**Project Unit: Meter**  
**Date: Wednesday: May 12: 2010**  
**Vertical Accuracy Objective**  
**Requirement Type: Accuracy(z)**  
**Accuracy(z) Objective: 1.00**  
**Confidence Level: 95%**  
**Control Points in Report: 521**  
**Elevation Calculation Method: Interpolated from TIN**  
**Control Points with LiDAR Coverage: 50**  
**Control Points with Required Accuracy (+/- 1.00): 50**  
**Percent of Control Points with Required Accuracy (+/- 1.00): 100.00**  
**Average Control Error Reported: 0.00**  
**Maximum (highest) Control Error Reported: 0.18**  
**Median Control Error Reported: 0.00**  
**Minimum (lowest) Control Error Reported: -0.18**  
**Standard deviation (sigma) of Z for sample: 0.08**  
**RMSE of Z for sample ( RMSE(z) ): 0.08: PASS**  
**FGDC/NSSDA Vertical Accuracy ( Accuracy(z) ): 0.15: PASS**  
**NSSDA Achievable Contour Interval: 0.3**  
**ASPRS Class 1 Achievable Contour Interval: 0.3**  
**NMAS Achievable Contour Interval: 0.3**

Control	Control Pt.	Control Pt.	Coverage	Control Pt.	from LiDAR	Z Error	Min Z	Median Z	Max Z
Point Id	X(East)	Y(North)		Z(Elev)	Z(Elev)				
	Meters	Meters		Meters	Meters	Meters	Meters	Meters	Meters
3558	695735.41	3804266.21	Yes	333.25	333.07	<b>-0.18</b>	333.07	333.10	333.16
3568	700651.49	3817267.59	Yes	345.95	345.81	<b>-0.14</b>	345.74	345.84	345.87
3640	731913.38	3768807.26	Yes	240.40	240.29	<b>-0.11</b>	240.22	240.29	240.30
3638	725453.33	3751748.69	Yes	203.80	203.70	<b>-0.10</b>	203.62	203.73	203.73
3619	712523.00	3781565.48	Yes	209.35	209.25	<b>-0.10</b>	209.19	209.26	209.27
3564	711404.87	3812676.69	Yes	321.10	321.00	<b>-0.10</b>	320.96	320.99	321.08
3557	695218.65	3799511.58	Yes	315.95	315.86	<b>-0.09</b>	315.75	315.82	315.87
3636	731010.34	3758327.88	Yes	210.15	210.07	<b>-0.08</b>	210.00	210.01	210.15
3545	692336.14	3820743.81	Yes	350.15	350.07	<b>-0.08</b>	350.00	350.06	350.09
3567	694651.91	3815520.34	Yes	331.30	331.23	<b>-0.07</b>	331.18	331.19	331.27
3615	712068.63	3791642.20	Yes	220.20	220.14	<b>-0.06</b>	220.13	220.14	220.15
3566	699674.66	3811264.42	Yes	321.65	321.59	<b>-0.06</b>	321.58	321.59	321.62
3635	731860.16	3763177.26	Yes	210.55	210.50	<b>-0.05</b>	210.46	210.48	210.54

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3608	703999.22	3800434.79	Yes	284.50	284.45	<b>-0.05</b>	284.39	284.44	284.47
3620	708307.02	3779460.03	Yes	254.15	254.11	<b>-0.04</b>	254.10	254.12	254.13
3614	706481.20	3789250.32	Yes	210.60	210.57	<b>-0.03</b>	210.54	210.60	210.63
3563	705601.46	3810935.15	Yes	317.85	317.82	<b>-0.03</b>	317.77	317.82	317.82
3559	701688.06	3806006.15	Yes	302.00	301.97	<b>-0.03</b>	301.89	302.00	302.02
3624	718167.58	3786229.70	Yes	192.00	191.98	<b>-0.02</b>	191.95	191.97	191.98
3610	715230.61	3803083.44	Yes	272.30	272.28	<b>-0.02</b>	272.24	272.28	272.30
3600	691576.70	3781653.61	Yes	268.05	268.03	<b>-0.02</b>	268.02	268.03	268.04
3609	709408.63	3802958.13	Yes	277.85	277.84	<b>-0.01</b>	277.77	277.84	277.86
3632	719734.15	3762304.99	Yes	229.15	229.15	<b>0.00</b>	229.06	229.13	229.23
3613	704717.52	3794802.21	Yes	256.60	256.60	<b>0.00</b>	256.56	256.60	256.63
3596	697483.09	3788108.53	Yes	205.50	205.50	<b>0.00</b>	205.47	205.50	205.53
3543	693695.45	3826739.46	Yes	380.30	380.30	<b>0.00</b>	380.29	380.30	380.31
3643	725207.72	3780760.89	Yes	218.55	218.56	<b>0.01</b>	218.56	218.56	218.57
3626	714084.14	3774048.74	Yes	213.00	213.01	<b>0.01</b>	212.99	213.02	213.12
3616	718411.52	3791873.51	Yes	225.95	225.96	<b>0.01</b>	225.91	225.96	225.97
3612	709525.14	3797511.25	Yes	260.65	260.66	<b>0.01</b>	260.66	260.66	260.68
3642	730846.25	3780879.39	Yes	236.25	236.27	<b>0.02</b>	236.26	236.27	236.39
3618	709837.43	3783028.17	Yes	242.25	242.28	<b>0.03</b>	242.26	242.27	242.30
3561	710940.09	3805945.04	Yes	297.30	297.33	<b>0.03</b>	297.28	297.31	297.35
3641	731689.40	3774441.44	Yes	226.80	226.84	<b>0.04</b>	226.81	226.85	226.87
3597	692173.30	3786495.66	Yes	252.85	252.89	<b>0.04</b>	252.88	252.89	252.89
3623	717970.18	3779810.15	Yes	215.25	215.30	<b>0.05</b>	215.29	215.30	215.31
3631	714853.49	3762348.70	Yes	219.55	219.61	<b>0.06</b>	219.60	219.61	219.62
3628	703185.74	3773828.08	Yes	264.20	264.26	<b>0.06</b>	264.19	264.26	264.31
3560	705518.27	3806099.13	Yes	315.55	315.61	<b>0.06</b>	315.51	315.58	315.66
3621	702724.35	3779051.83	Yes	263.45	263.52	<b>0.07</b>	263.48	263.52	263.56
3544	698633.85	3822002.00	Yes	360.45	360.52	<b>0.07</b>	360.50	360.53	360.55
3645	719706.68	3774187.38	Yes	238.15	238.23	<b>0.08</b>	238.20	238.20	238.30
3639	726013.37	3768676.06	Yes	221.55	221.63	<b>0.08</b>	221.45	221.60	221.76
3633	721017.64	3759025.08	Yes	204.60	204.68	<b>0.08</b>	204.49	204.73	204.73
3629	708286.13	3769096.29	Yes	241.65	241.74	<b>0.09</b>	241.73	241.76	241.77
3601	685667.64	3781528.04	Yes	272.10	272.20	<b>0.10</b>	272.15	272.21	272.22
3634	725788.94	3762334.32	Yes	225.55	225.66	<b>0.11</b>	225.57	225.59	225.72
3630	714133.39	3768464.20	Yes	220.45	220.58	<b>0.13</b>	220.50	220.56	220.62
3599	694958.52	3778236.68	Yes	287.80	287.95	<b>0.15</b>	287.94	287.94	287.97
3622	702744.44	3784716.16	Yes	204.25	204.43	<b>0.18</b>	204.42	204.44	204.47

**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

**Post-filter Control Report for Area 5 UTM14**

**Project File: Area 5 UTM14**

**Project Unit: Meter**

**Date: Tuesday: July 06: 2010**

**Vertical Accuracy Objective**

**Requirement Type: Accuracy(z)**

**Accuracy(z) Objective: 0.60**

**Confidence Level: 95%**

**Control Points in Report: 521**

**Elevation Calculation Method: Interpolated from TIN**

**Control Points with LiDAR Coverage: 9**

**Control Points with Required Accuracy (+/- 0.60): 9**

**Percent of Control Points with Required Accuracy (+/- 0.60): 100.00**

**Average Control Error Reported: -0.04**

**Maximum (highest) Control Error Reported: 0.13**

**Median Control Error Reported: -0.04**

**Minimum (lowest) Control Error Reported: -0.17**

**Standard deviation (sigma) of Error for sample: 0.09**

**RMSE of Error for sample ( RMSE(z) ): 0.09: PASS**

**FGDC/NSSDA Vertical Accuracy ( Accuracy(z) ): 0.18: PASS**

**NSSDA Achievable Contour Interval: 0.4**

**ASPRS Class 1 Achievable Contour Interval: 0.3**

**NMAS Achievable Contour Interval: 0.4**

Control	Control Pt.	Control Pt.	Coverage	Control Pt.	from LiDAR	Z Error	Min Z	Median Z	Max Z
Point Id	X(East)	Y(North)		Z(Elev)	Z(Elev)				
	Meters	Meters		Meters	Meters	Meters	Meters	Meters	Meters
3658	697230.79	3944301.20	Yes	244.35	244.18	<b>-0.17</b>	244.14	244.14	244.24
3655	695676.12	3936220.50	Yes	253.55	253.44	<b>-0.11</b>	253.43	253.43	253.50
3650	707111.83	4023798.95	Yes	249.40	249.29	<b>-0.11</b>	249.26	249.26	249.34
3656	695712.57	3939423.72	Yes	256.15	256.08	<b>-0.07</b>	255.97	256.01	256.12
3648	694173.31	4013451.26	Yes	302.10	302.06	<b>-0.04</b>	302.02	302.07	302.08
3659	702012.94	3945231.66	Yes	244.10	244.08	<b>-0.02</b>	244.06	244.10	244.10
3652	713364.64	4031612.68	Yes	233.85	233.83	<b>-0.02</b>	233.63	233.82	233.87
3649	703782.01	4018474.40	Yes	252.75	252.76	<b>0.01</b>	252.74	252.80	252.86
3653	697415.39	3928784.98	Yes	297.00	297.13	<b>0.13</b>	297.12	297.13	297.19



**NRCS Oklahoma Dam Rehab  
LiDAR Mapping Report**

**Post-filter Control Report for Area 5 UTM15**

**Project File: Area 5 UTM15**

**Project Unit: Meter**

**Date: Tuesday: July 06: 2010**

**Vertical Accuracy Objective**

**Requirement Type: Accuracy(z)**

**Accuracy(z) Objective: 0.60**

**Confidence Level: 95%**

**Control Points in Report: 8**

**Elevation Calculation Method: Interpolated from TIN**

**Control Points with LiDAR Coverage: 8**

**Control Points with Required Accuracy (+/- 0.60): 8**

**Percent of Control Points with Required Accuracy (+/- 0.60): 100.00**

**Average Control Error Reported: -0.05**

**Maximum (highest) Control Error Reported: 0.07**

**Median Control Error Reported: -0.04**

**Minimum (lowest) Control Error Reported: -0.2**

**Standard deviation (sigma) of Error for sample: 0.09**

**RMSE of Error for sample ( RMSE(z) ): 0.10: PASS**

**FGDC/NSSDA Vertical Accuracy ( Accuracy(z) ): 0.19: PASS**

**NSSDA Achievable Contour Interval: 0.4**

**ASPRS Class 1 Achievable Contour Interval: 0.3**

**NMAS Achievable Contour Interval: 0.4**

Control	Control Pt.	Control Pt.	Coverage	Control Pt.	from LiDAR	Z Error	Min Z	Median Z	Max Z
Point Id	X(East)	Y(North)		Z(Elev)	Z(Elev)				
	Meters	Meters		Meters	Meters	Meters	Meters	Meters	Meters
3660	333227.87	3919156.80	Yes	177.30	177.10	<b>-0.20</b>	177.05	177.22	177.24
3669	311931.88	3847647.04	Yes	210.05	209.90	<b>-0.15</b>	209.87	209.90	209.98
3663	345026.26	3925784.48	Yes	162.90	162.83	<b>-0.07</b>	162.77	162.83	162.88
3668	312184.84	3844399.88	Yes	204.85	204.79	<b>-0.06</b>	204.77	204.80	204.81
3661	336880.34	3921094.12	Yes	154.40	154.38	<b>-0.02</b>	154.30	154.36	154.42
3664	345078.59	3929013.99	Yes	170.80	170.79	<b>-0.01</b>	170.75	170.78	170.85
3665	346665.79	3932199.83	Yes	205.00	205.01	<b>0.01</b>	204.96	204.99	205.02
3666	314419.92	3837897.92	Yes	192.00	192.07	<b>0.07</b>	192.05	192.06	192.08

# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

## LiDAR CALIBRATION

Note: All figures represented on the following pages are for general illustration purposes, and are not examples derived from actual NRCS Oklahoma Dam data.

### Introduction

A LiDAR calibration or 'boresight' is performed on every mission to determine and eliminate systemic biases that occur within the hardware of the Leica ALS50 laser scanning system, the inertial measurement unit (IMU), and because of environmental conditions which affect the refraction of light. The systemic biases that are corrected for include roll, pitch, and heading.

### Calibration Procedures

In order to correct the error in the data, misalignments of features in the overlap areas of the LiDAR flightlines must be detected and measured. At some point within the mission, a specific flight pattern must be flown which shows all the misalignments that can be present. Typically, Merrick flies a pattern of at least three opposing direction and overlapping lines, three of which provide all the information required to calibrate the system.



Figure 1: Flight pattern required for calibration

### Correcting for Pitch and Heading Biases

There are many settings in the ALS40/50 post processor that can be used to manipulate the data; six are used for boresighting. They are roll, pitch, heading, torsion, range and atmospheric correction. The order in which each is evaluated is not very important and may be left to the discretion of the operator. For this discussion, pitch and heading will be evaluated first. It is important to remember that combinations of error can be very confusing, and this is especially true with pitch and heading. They affect the data in similar ways, so error attributed to pitch may be better blamed on heading and vice versa. To see a pitch/heading error, one must use the profile tool to cut along the flight path at a pitched roof or any elevation feature that is perpendicular to the flight path. View the data by elevation to locate these scenarios.

# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

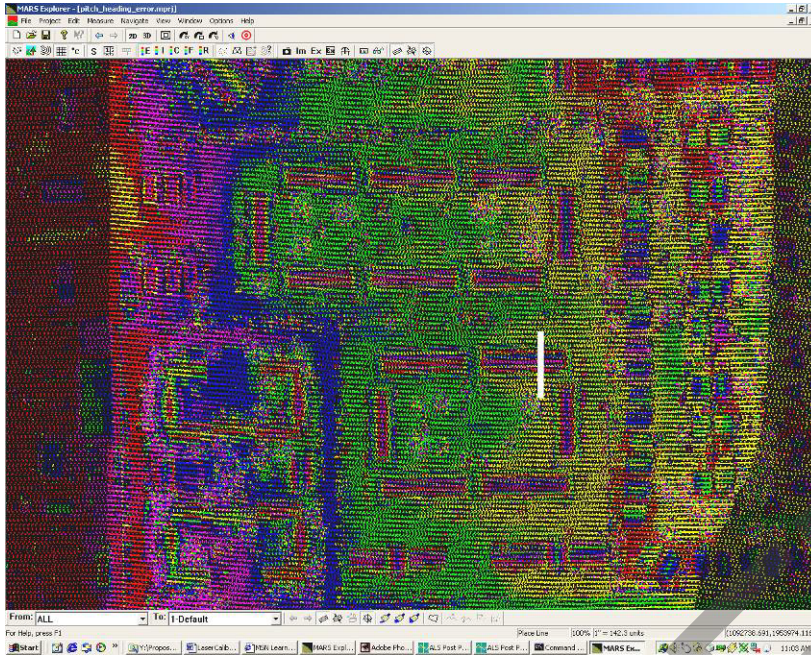


Figure 2: Orthographic view with profile line

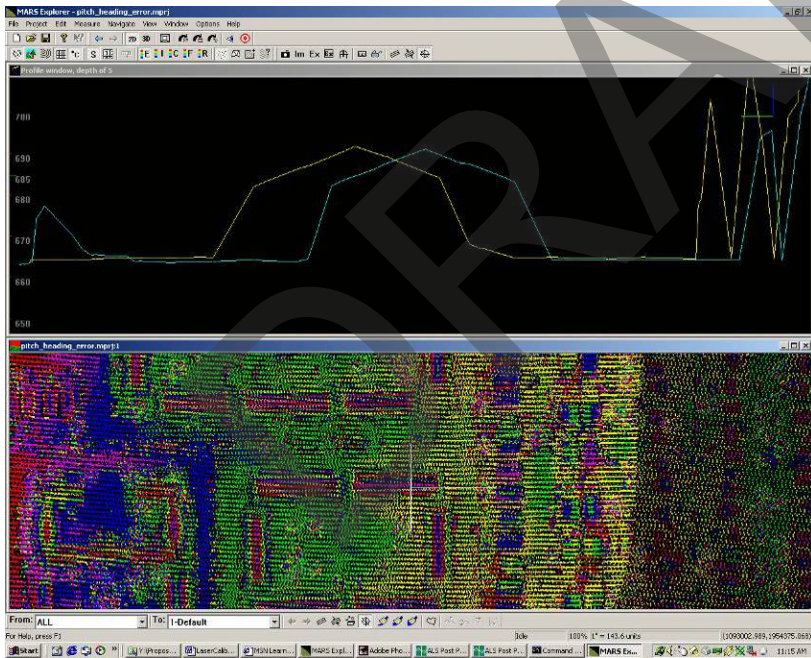


Figure 3: Profile view of misalignment

The profile line in Figures 2 and 3 has an additional thin line perpendicular to the cut that shows the direction of the view. In this case, the line is pointing to the right, or east. In the profile window, we are looking through two separate TINs, so there are two lines showing the location of the same building. The yellow line is from the flight line on the left (flown north); the light blue line is from the flight line in the middle (flown south).

## NRCS Oklahoma Dam Rehab LiDAR Mapping Report

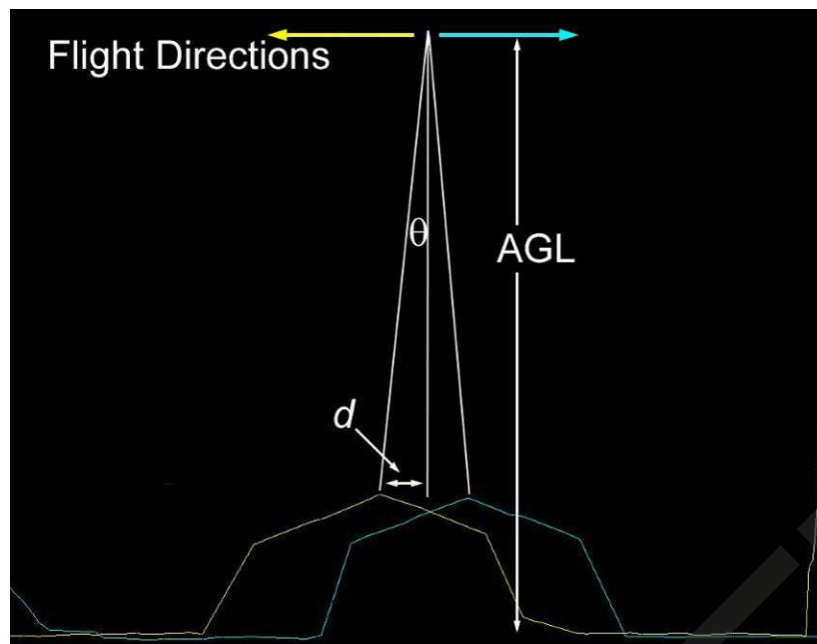


Figure 4: Adjusting pitch

The top arrows represent each respective flight direction. We are looking east, the yellow flight line was flown north, and the blue line is flown south. Adjusting pitch changes the relationship between the pitch from the IMU and the actual pitch of the plane. Increasing pitch sends the nose of the plane up and the data ahead in the flight direction. Lowering pitch does the opposite. In this example, pitch needs to decrease in order to bring these two roof lines together. The angle theta must be expressed in radians. The formula to arrive at this angle is...

$$\theta = \frac{\arctan\left(\frac{d}{AGL}\right)}{57.2958}$$

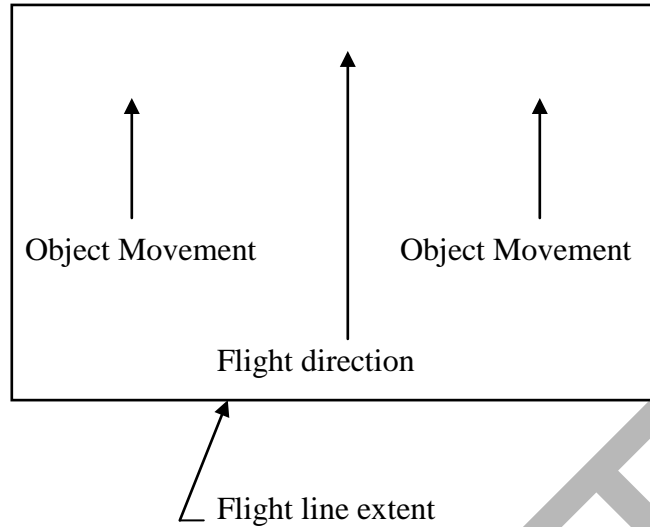
where  $d$  is the distance from nadir (directly under the plane) to the peak of the roof and AGL is the 'above ground level' of the plane. The conversion from degrees to radians is one radian equals 57.2958 degrees. This number is then subtracted from the pitch value that was used to create the data.

The next issue to resolve, before actually changing the pitch value, is to determine if this shift is at all due to an incorrect heading value, since heading will move data in the direction of flight also. The difference is that heading rotates the data, meaning that when heading is changed, objects on opposite sides of the swath move in opposite directions.

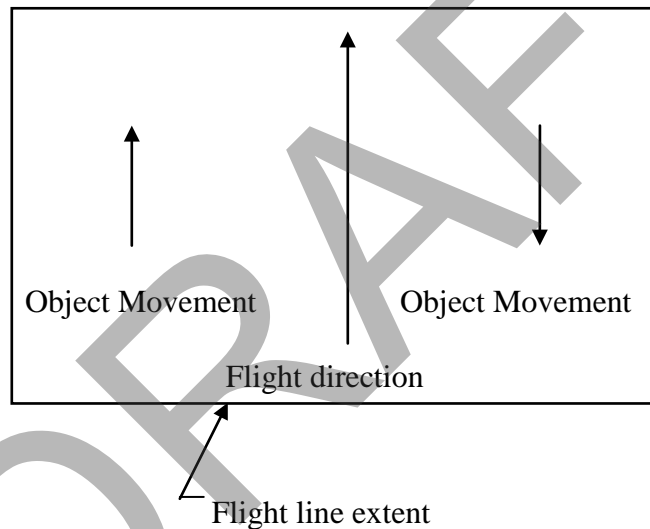
Figures 5 and 6: Pitch and Heading movement.

**Pitch increases, objects throughout the data move forward.**

## NRCS Oklahoma Dam Rehab LiDAR Mapping Report



***Heading increases, objects move clockwise.***



When heading changes, objects on the sides of the flight line move in opposite directions. If heading is increased, objects in the flight line move in a clockwise direction. If heading is decreased, objects move in a counter-clockwise direction.

To find out if heading is correct, a similar profile line must be made in the overlap area between the middle flight line and the one to the east, or right side. If the distance  $d$  (see Figure 4) is different on the right versus the left, then heading is partially responsible for the error. If the distance  $d$  is the same on both sides then heading or pitch is fully responsible.

### **Correcting for the Roll Bias**

# NRCS Oklahoma Dam Rehab LiDAR Mapping Report

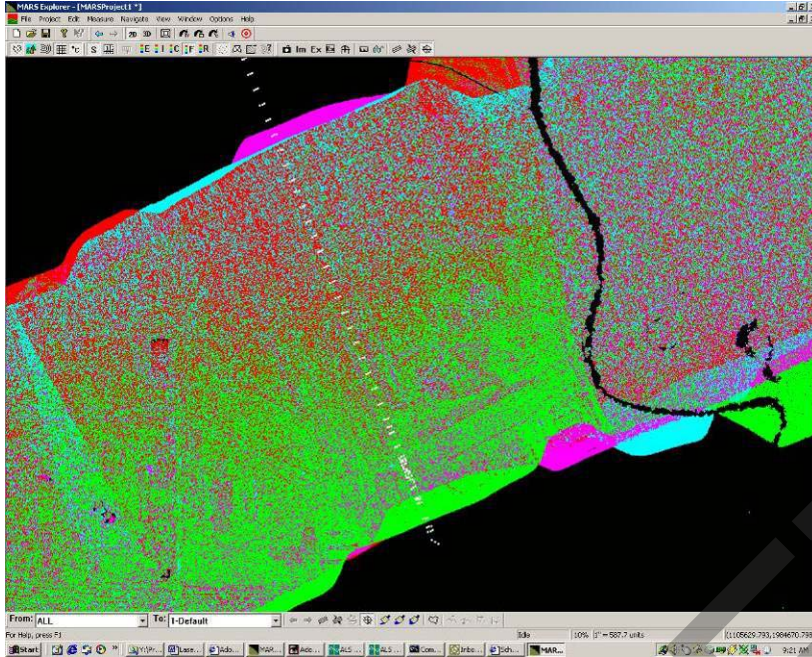


Figure 7: The truth survey

Each pair of flight lines was flown in opposite directions, and in this case the red and blue lines were flown east and the green and magenta lines were flown west. The first step is to make a profile line across the survey. Once the profile is created, exaggeration of the elevation by 100 times is necessary to see the pattern. (Figure 8)

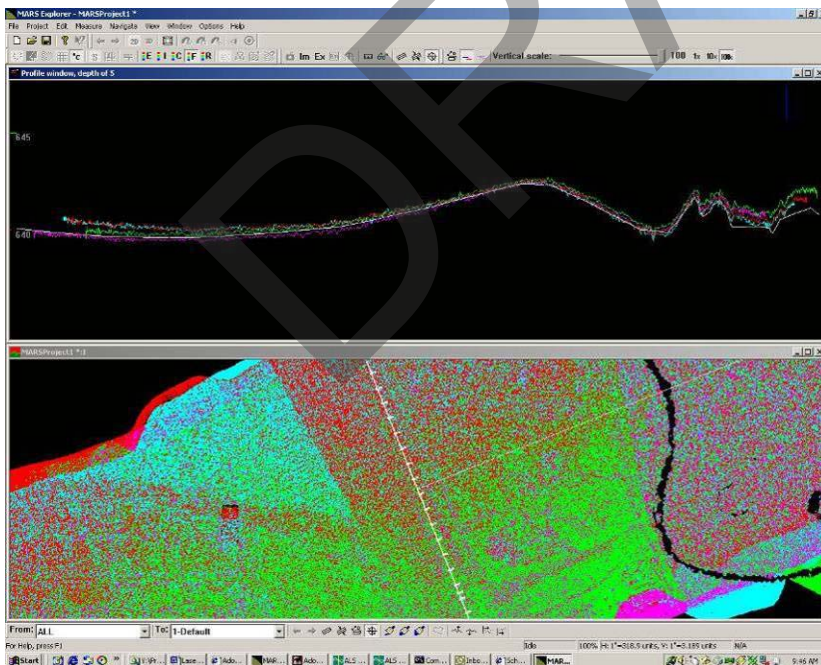


Figure 8: Profile view of calibration flight lines

## NRCS Oklahoma Dam Rehab LiDAR Mapping Report

Even without zooming in, a pattern is already apparent. The two east flow lines, red and blue, are high on the left compared to the west flow lines, and low on the right. Since the profile line was created with the view eastward, it is easiest to think about what the east lines are doing. The east lines are low on the right, which means the relationship between the IMU and the right wing of the plane must be adjusted up. As in heading adjustments, sending the data in a clockwise direction is positive. If the axis of the clock is the tail/nose axis of the plane, then it is obvious this data must go in a counter clock-wise, or negative direction. The method for determining the magnitude of the adjustment is similar to determining the magnitude of the adjustment for the pitch. The only difference is how the triangles are drawn in relationship to the data. (Figures 9 and 10)

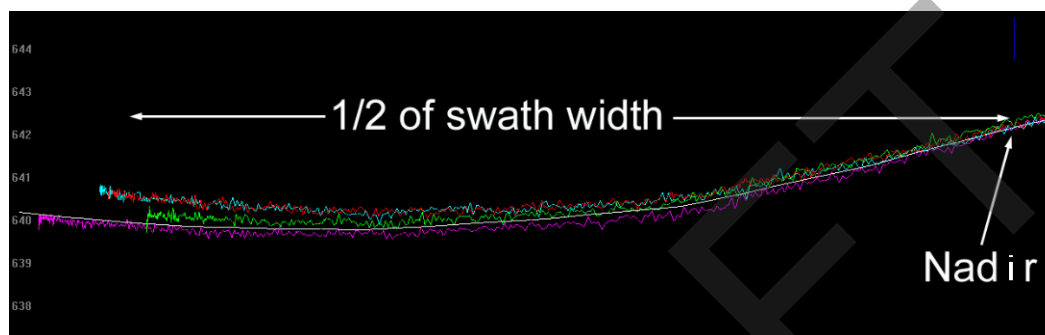


Figure 9: Half of calibration profile

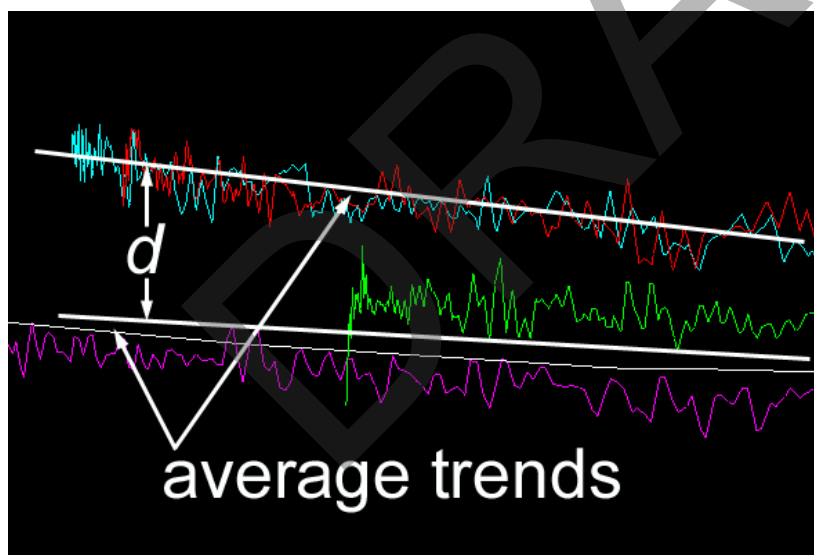


Figure 10: Differences in average roll trends

The important measurements for this formula are the distance from nadir to the edge of the swath, or  $\frac{1}{2}$  swath width, and  $d$ , the distance from the two average trend lines for each group. Since any adjustments made to roll effect both east and west lines, we are really interested in  $\frac{1}{2} d$ ; this will give the value that will bring both sets of lines together. The formula is:

## NRCS Oklahoma Dam Rehab LiDAR Mapping Report

$$\theta = \frac{\arctan\left(\frac{d/2}{EdgeToNadir}\right)}{57.2958}$$

### **Correcting the Final Elevation**

The next step is to ensure that all missions have the same vertical offset. Two techniques are used to achieve this. The first is to compare all calibration flight lines and shift the missions appropriately. The second is to fly an extra 'cross flight' which touches all flight lines in the project. Each mission's vertical differences can then be analyzed and corrected. However, the result of this exercise is only proof of a high level of relative accuracy. Since many of the calibration techniques affect elevation, project wide GPS control must be utilized to place the surface in the correct location. This can be achieved by utilizing the elevation offset control in the post processor or by shifting the data appropriately in MARS®. The control network may be pre-existing or collected by a licensed surveyor. This is always the last step and is the only way to achieve the high absolute accuracy that is the overall goal.

### **LIDAR CLASSIFICATION**

#### **Auto-Filter (automated)**

Merrick uses its proprietary software MARS® to classify an automated bare-earth (i.e., ground / Class 2) solution from the LiDAR point cloud. The software uses several different algorithms combined in a macro to determine the classification for each point. Filter parameters are adjusted based on the terrain and land cover for each project to produce the best ground result and to minimize hand-filter. Merrick's automated filters typically classify 85- to 90-percent of the ground.

#### **Hand-Filter (manual editing)**

The remaining 10 to 15 percent of the points resulting from the automated filtering techniques are possibly misclassified and require final editing. Using the MARS® software, Merrick has several manual edit tools which allow us to re-classify these features to the appropriate class. All the data within the project extent is viewed by an operator to ensure all artifacts are removed, and that we are meeting project specifications. Once it is deemed the best ground solution is met, Merrick performs a final auto-filter to classify all points to meet the ASPRS LAS 1.2 specification. During this process all non-ground points are classified to Class 1 (Unclassified) and ground points are classified to Class 2.

#### **All Points LAS 1.2**

Merrick exports all Class 1 (unclassified) & Class 2 (ground) LiDAR points to the project tiling scheme. Classifications, intensity values, flight information, flight acquisition date, return values and flight line values are retained. Projection information is assigned to the las in the export process.

### **DIGITAL ELEVATION MODEL (DEM)**

#### **Bare Earth Raster Grid Development**



## NRCS Oklahoma Dam Rehab LiDAR Mapping Report

Merrick exports the Class 2 (ground) LiDAR points to a two-meter (2m) cell size ESRI floatgrid (.flt) using MARS®. These floatgrids are formatted to the project tiling scheme. Using the ArcInfo Workstation floatgrid command, the floatgrids are imported and converted to ESRI raster grids (2m resolution). The result is a seamless (tile edge to tile edge) DEM in ArcGrid (i.e., ESRI grid) floating point format. Projection information is applied that reflects the classified LAS / project requirements

### **Bare Earth ESRI Geodatabase**

Merrick imports the Class 2 (ground) LiDAR points to a Multipoint Feature Class using ESRI software. Each entity in the multipoint feature class consists of 2000 to 3000 points.

### **DIGITAL SURFACE MODEL (DSM)**

#### **First Return Raster Grid Development**

Merrick exports the First Return from Class 1 (unclassified) & 2 (ground) LiDAR points to a two-meter (2m) cell size ESRI floatgrid (.flt) using MARS®. These floatgrids are formatted to the project tiling scheme. Using the ArcInfo Workstation floatgrid command, the floatgrids are imported and converted to ESRI raster grids (2m resolution). The result is a seamless (tile edge to tile edge) DEM in ArcGrid (i.e., ESRI grid) floating point format. Projection information is applied that reflects the classified LAS / project requirements

#### **First Return LAS 1.2**

Merrick exports the First Return from Class 1 (unclassified) & Class 2 (ground) LiDAR points to the project tiling scheme. Intensity values, flight information, flight acquisition date, return values and flight line values are retained. Projection information is assigned to the las in the export process.

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**APPENDIX C**

**NODATA Checking Results**

Erdas Imagine File Information

-----

File Name: be\_z14  
Last Modified: Wed Jul 14 10:28:14 2010  
Number of Layers: 1

Layer Information:

Name : :be\_z14  
Width : 186075  
Height : 141431  
Type : Continuous  
Block Width : 512  
Block Height : 4  
Pixel Depth :Float  
Compression Type : Default

Statistics :

Last Modified : Sun Jul 25 17:18:42 2010  
Maximum Value : 785.358643  
Minimum Value : 137.476212  
Mean : 382.261702  
Median : 357.655006  
Mode : 314.631564  
Standard Deviation : 133.301917

DRAFT

Erdas Imagine File Information

-----

File Name: be\_z15  
Last Modified: Tue Jul 27 17:18:30 2010  
Number of Layers: 1

Layer Information:

Name : :be\_z15  
Width : 20265  
Height : 49447  
Type : Continuous  
Block Width : 512  
Block Height : 4  
Pixel Depth : Float  
Compression Type : Default

Statistics :

Last Modified : Tue Jul 27 17:53:56 2010  
Maximum Value : 336.969208  
Minimum Value : 139.348602  
Mean : 187.585764  
Median : 181.806154  
Mode : 156.331623  
Standard Deviation : 32.762289

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**APPENDIX D**

**Virus Scanning Certification**

