

Lidar Mapping Report

Acquisition, Processing, and Delivery of Airborne Lidar Elevation Data for CWCB – Northeastern and Southeastern Colorado

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Glossary of Terms

Term	Description
AGL	Above Ground Level
AGPS	Airborne Global Positioning System
ANPD	Aggregate Nominal Pulse Density
ANPS	Aggregate Nominal Pulse Spacing
ASPRS	American Society of Photogrammetry and Remote Sensing
AT	Aerial Triangulation
CD	Compact Disk
CMS	Certified Mapping Scientist
CORS	Continuous Operating Reference Station
CP	Certified Photogrammetrist
CVA	Consolidated Vertical Accuracy
DACS™	Digital Airborne Camera System
DEM	Digital Elevation Model
DFIRM	Digital Flood Insurance Rate Maps
DSM	Digital Surface Model
DTM	Digital Terrain Model
DVD	Digital Versatile Disk / Digital Video Disk
DXF	Data Exchange Format / Drawing Interchange
FIRM	Flood Insurance Rate Maps
FEMA	Federal Emergency Management
FGDC	Federal Geographic Data Committee
FVA	Fundamental Vertical Accuracy
FY	Fiscal Year
GIS	Geographic Information System
GISP	Geographic Information System Professional
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GSD	Ground Sample Distance
HARN	High Accuracy Reference Network
HDD	Hard Drive Disk
HPGN	High Precision Geodetic Network
IMU	Inertial Measurement Unit
INS	Inertial Navigation System
LAS	(or .las) – industry accepted LIDAR data exchange file format
LB	License Business
LS	Land Surveyor
LIDAR	(or Lidar) Light Detection And Ranging
MARS®	Merrick Advanced Remote Sensing
Merrick	Merrick & Company
MSL	Mean Sea Level
NAD	North American Datum
NDEP	National Digital Elevation Program
NGP	National Geospatial Program
NGS	National Geodetic Survey
NMAS	National Map Accuracy Standards
No.	Number
NPS	Nominal Point Spacing

NSRS	National Spatial Reference System
NSSDA	National Standard for Spatial Data
NVA	Non-vegetated Vertical Accuracy
OPUS	Online Positioning User Service
PDOP	Positional Dilution Of Precision
PLS	Professional Land Surveyor
PLSS	Public Land Survey System
ppsm	Points (or pulses) per square meter
PSM	Professional Surveyor and Mapper
QL1	Quality Level One
QL2	Quality Level Two
RLS	Registered Land Surveyor
RGB	Red, Green, Blue (i.e., three-band image)
RGBNIR	Red, Green, Blue, Near Infra-Red (i.e., four-band image)
RMSE	Root Mean Square Error
SBET	Smoothed Best Estimated Trajectory
SHA	Secured Hash Standard
SPCS	State Plane Coordinate System
SVA	Supplemental Vertical Accuracy
TIN	Triangular Irregular Network
USGS	United State Geological Survey
VVA	Vegetated Vertical Accuracy
XML	eXtensible Markup Language

Project Summary

Merrick & Company (Merrick) was awarded the Southeastern and Northeastern Colorado Lidar project by the Department of Natural Resources (DNR) Colorado Water Conservation Board (CWCB) to provide high resolution lidar terrain mapping for supporting natural resource and infrastructure projects. The project area covers all or portions of Logan, Sedgwick, Phillips, Washington, Yuma, Bent, Prowers, Las Animas, Kiowa, and Baca Counties in the State of Colorado. The AOI covers a total of approximately 12,035.76 square miles with a QL2 lidar specification.

The lidar mapping requirements and deliverables meet Quality Level Two (QL2) standards for final deliverables as outlined in the USGS-NGP Lidar Base Specifications, Techniques and Methods 11–B4, Version 1.3, February 2018 (TM11-B4) (<http://pubs.usgs.gov/tm/11b4/pdf/tm11-B4.pdf>). QL2 lidar specifications suggest a pulse density of greater than or equal to eight pulses per square meter ($\geq 2\text{ppsm}$) Aggregate Nominal Pulse Density (ANPD), and pulse spacing of less than or equal to thirty-five centimeters ($\leq 0.71\text{m}$) Aggregate Nominal Pulse Spacing (ANPS).

The vertical accuracy requirements of the lidar data meets or exceeds the following:

Absolute Vertical Accuracy

- $\leq 10\text{cm}$ RMSE_z
- $\leq 19.6\text{cm}$ Non-vegetated Vertical Accuracy (NVA) at the 95% confidence level
- $\leq 29.4\text{cm}$ Vegetated Vertical Accuracy (VVA) at the 95% percentile

Relative Vertical Accuracy

- $\leq 6\text{cm}$ within individual swaths (smooth surface repeatability)
- $\leq 8\text{cm}$ RMSD_z within swath overlap (between adjacent swaths)

Project Spatial Reference

- Horizontal Datum – North American Datum of 1983 (NAD 83)
- Epoch – National Adjustment of 2011 (NA2011) (epoch 2010.00)
- Geoid – GEOID 12B
- Vertical Datum – North American Vertical Datum of 1988 (NAVD 88)
- Projection – Colorado State Plane Coordinate System (SPCS), North and South Zones
- Units – U.S. Foot

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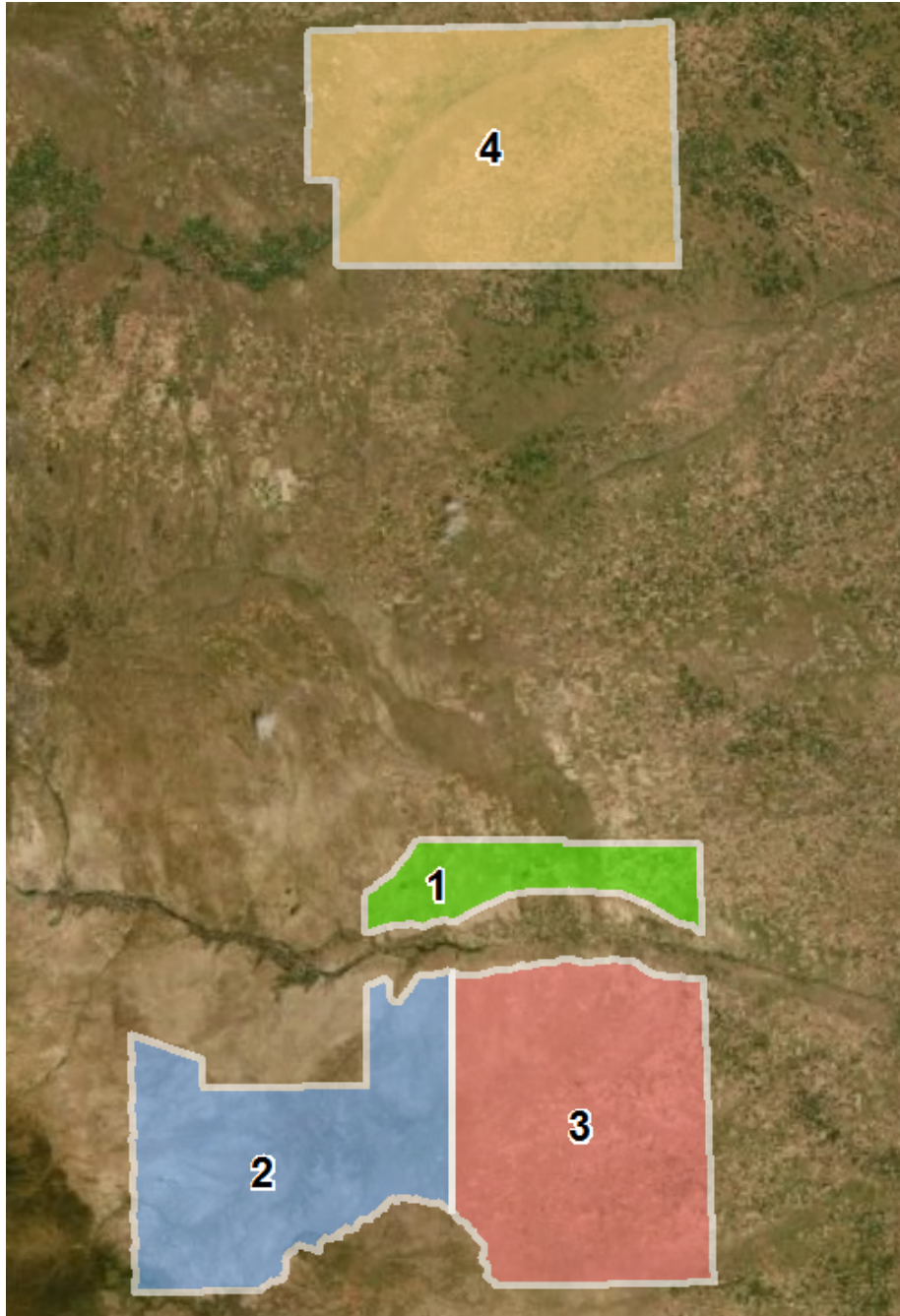
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Project Report

The contents of this report summarize the methods used to calibrate and classify the lidar data as well as the results of these methods for the Southeastern and Northeastern Colorado Lidar project.

Lidar Flight Information

The acquisition area for the Southeastern and Northeastern Colorado Lidar project is delineated by the extent of the client approved Esri shapefile (*CWCB_2019_BPA_utm13_new*). Merrick acquired the QL2 lidar point cloud utilizing an Optech Galaxy PRIME lidar sensor. The Galaxy is a high performance lidar sensor capable of collecting large areas efficiently. The project was flown and then processed and delivered in sections (4 Blocks), 1-3 in Colorado South Zone and 4 in Colorado North Zone coordinate system.



Aerial Mission(s)

Lidar acquisition was collected using a fixed wing aircraft and an Optech Galaxy PRIME lidar sensor staging from a variety of airports around the project area. Lidar data collection for the project was accomplished between July 31, 2019 and October 5, 2019. Each mission represents a lift of the aircraft and system from the ground, collects data, and lands again. Multiple lifts within a day are represented by Mission A, B, C, and D. The table below relates each mission to the date collected, the sensor and serial number used, and the actual average MSL in meters.

Mission(s)	Date	Sensor S/N	Actual Avg. MSL (m)
190731_A	July 31, 2019	5060380	3885
190804_A	August 4, 2019	5060380	3910
190809_A	August 9, 2019	5060380	4120
190810_A	August 10, 2019	5060380	4010
190811_A	August 11, 2019	5060380	4060
190812_A	August 12, 2019	5060380	4460
190812_B	August 12, 2019	5060380	3920
190813_A	August 13, 2019	5060380	4340
190815_A	August 15, 2019	5060380	4370
190815_B	August 15, 2019	5060380	3900
190816_A	August 16, 2019	5060380	4275
190817_A	August 17, 2019	5060380	4090
190817_B	August 17, 2019	5060380	3940
190818_A	August 18, 2019	5060380	4000
190818_B	August 18, 2019	5060380	4080
190819_A	August 19, 2019	5060380	4085
190819_B	August 19, 2019	5060380	4065
190820_A	August 20, 2019	5060380	4050
190820_B	August 20, 2019	5060380	3990
190822_A	August 22, 2019	5060380	4060
190822_B	August 22, 2019	5060380	4050
190825_A	August 25, 2019	5060380	4200
190826_A	August 26, 2019	5060380	3945
190828_A	August 28, 2019	5060380	3940
190829_A	August 29, 2019	5060380	4080
190901_A	September 1, 2019	5060380	4000
190903_A	September 3, 2019	5060380	4005
190903_B	September 3, 2019	5060380	4020
190907_A	September 7, 2019	5060380	4025
191005_A	October 5, 2019	5060380	4570

GNSS / IMU Data

A five-minute INS initialization is conducted on the ground, with the aircraft engines running, prior to flight, to establish fine-alignment of the INS. GPS ambiguities are resolved by flying within ten kilometers of the 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 base stations to aid in post-processing. Data is sent back to the main office for preliminary processing to check overall quality of GPS / INS data and to ensure sufficient overlap between flight lines. Any problematic data may be re-flown immediately as required.

The airborne GPS data was post-processed using Applanix POSPac Mobile Mapping Suite version 8.x. 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 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. 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 POSPac Mobile Mapping Suite version 8.x. The SBET and refined attitude data are then utilized in the LMS 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 Optech LMS processor software for each pulse which ensures the greatest chance of ground returns in a heavily forested area.

GPS Controls

Virtual Ground GNSS Base Station(s) were used to control the lidar airborne flight lines. Trimble CenterPoint™ RTX™ correction service is a high-accuracy, satellite-delivered global positioning service. This technology provides high-accuracy GNSS positioning without the use of traditional reference station-based differential RTK infrastructure and delivers very high cm level accuracy. In addition, CORS (Continually Operating Reference Stations) are at times used to further enhance the airborne solution.

Lidar Calibration – see appendix 1 for a more detailed workflow description

Merrick takes great care to ensure all lidar acquisition missions are carried out in a manner conducive to post-processing an accurate data set. This begins in the flight-planning stage with attention to GPS baseline distances and GPS satellite constellation geometry and outages. Proper AGPS surveying techniques are always followed including pre- and post-mission static initializations. In-air IMU alignments (figure-eights) are performed both before and after on-site collection to ensure proper calibration of the IMU accelerometers and gyros.

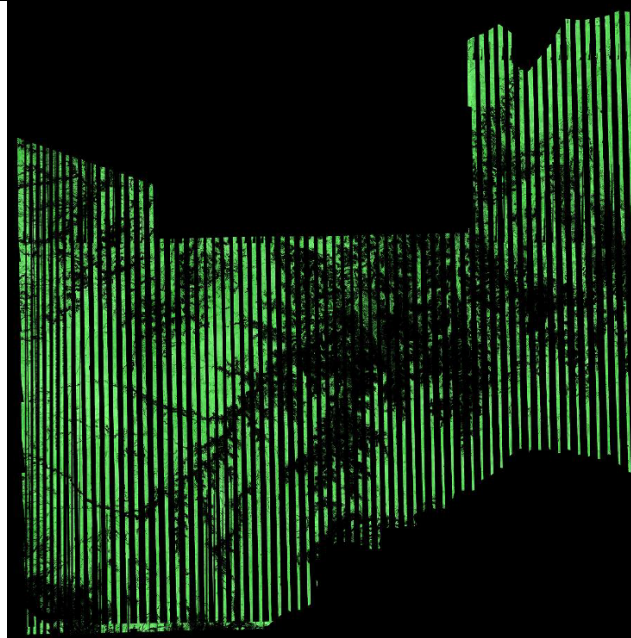
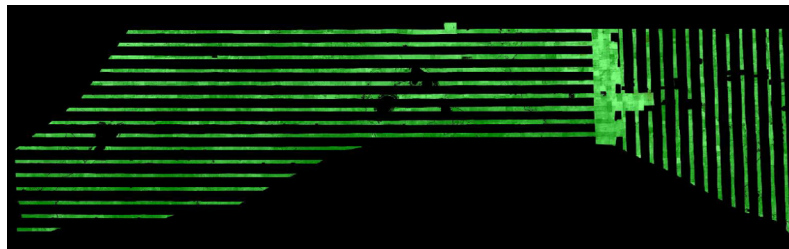
A minimum of one cross-flight is planned throughout the project area across all flightlines and over roadways where possible. The cross-flight provides a common control surface used to remove any vertical discrepancies in the lidar data between flightlines. The cross-flight is critical to ensure flightline ties across the project area. The areas of overlap between flightlines are used to boresight (calibrate) the lidar point cloud to achieve proper flightline to flightline alignment in all three axes. This includes adjustment of both IMU and scanner-related

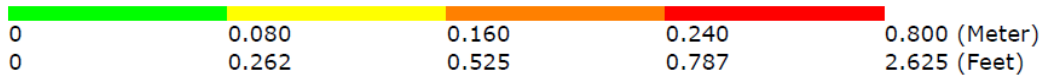
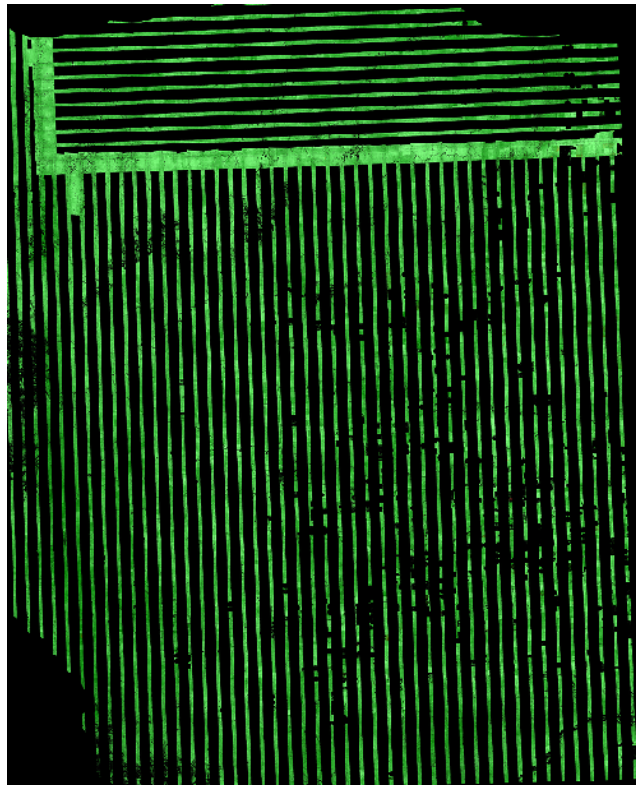
variables such as roll, pitch, heading, timing interval (range), and torsion. Each lidar mission flown is accompanied by a hands-on boresight in the office.

After boresighting is complete a detailed statistical report is generated to check relative and absolute accuracies before filtering of lidar begins.

Relative Accuracy – flight line to flight line

The project representative flight line separation raster (below) depicts the vertical separation of flight lines by thematically coloring the separation magnitude on a color ramp based on relative distance.





Survey – Lidar Calibration Control / Lidar Checkpoints

Merrick surveyors established lidar calibration and lidar checkpoints spatially distributed across the project AOI as the method to validate absolute vertical accuracy. *See Appendix 2 for more detailed survey reporting.*

Unfiltered Lidar Control Point Report

The following statistical results of the lidar data compared to the lidar control points post-calibration. The results show the difference between the lidar points and the 133 surveyed ground points, 45 Colorado North Zone and 88 Colorado South Zone, used for lidar calibration.

Colorado North Zone

Project Data Unit: U.S. Survey Foot
Vertical Accuracy Class tested: 10.0-cm
Elevation Calculation Method: Interpolated from TIN
LiDAR Classifications Included: 2/0 Ground (All)/0W

Check Points in Report: 45
Check Points with LiDAR Coverage: 45
Check Points (NVA): 45
Check Points (VVA): 0
Average Vertical Error Reported: -0.002 U.S. Survey Foot
Maximum (highest) Vertical Error Reported: 0.37 U.S. Survey Foot
Median Vertical Error Reported: 0.013 U.S. Survey Foot
Minimum (lowest) Vertical Error Reported: -0.413 U.S. Survey Foot
Standard deviation of Vertical Error: 0.186 U.S. Survey Foot
Skewness of Vertical Error: -0.300
Kurtosis of Vertical Error: -0.478
Non-vegetated Vertical Accuracy (NVA) RMSE(z): 5.612cm PASS
Non-vegetated Vertical Accuracy (NVA) at the 95% Confidence Level +/-: 11.000cm PASS
FGDC/NSSDA Vertical Accuracy at the 95% Confidence Level +/-: 11.000cm
Non-vegetated Vertical Accuracy (NVA) RMSE(z) (DEM): 5.760cm PASS
Non-vegetated Vertical Accuracy (NVA) at the 95% Confidence Level +/- (DEM): 11.289cm PASS

This data set was tested to meet ASPRS Positional Accuracy Standard for Digital Geospatial Data (2014) for a 10.0-cm RMSEz Vertical Accuracy Class. Actual NVA accuracy was found to be RMSEz = 5.612cm, equating to +/- 11.000cm at the 95% confidence level.

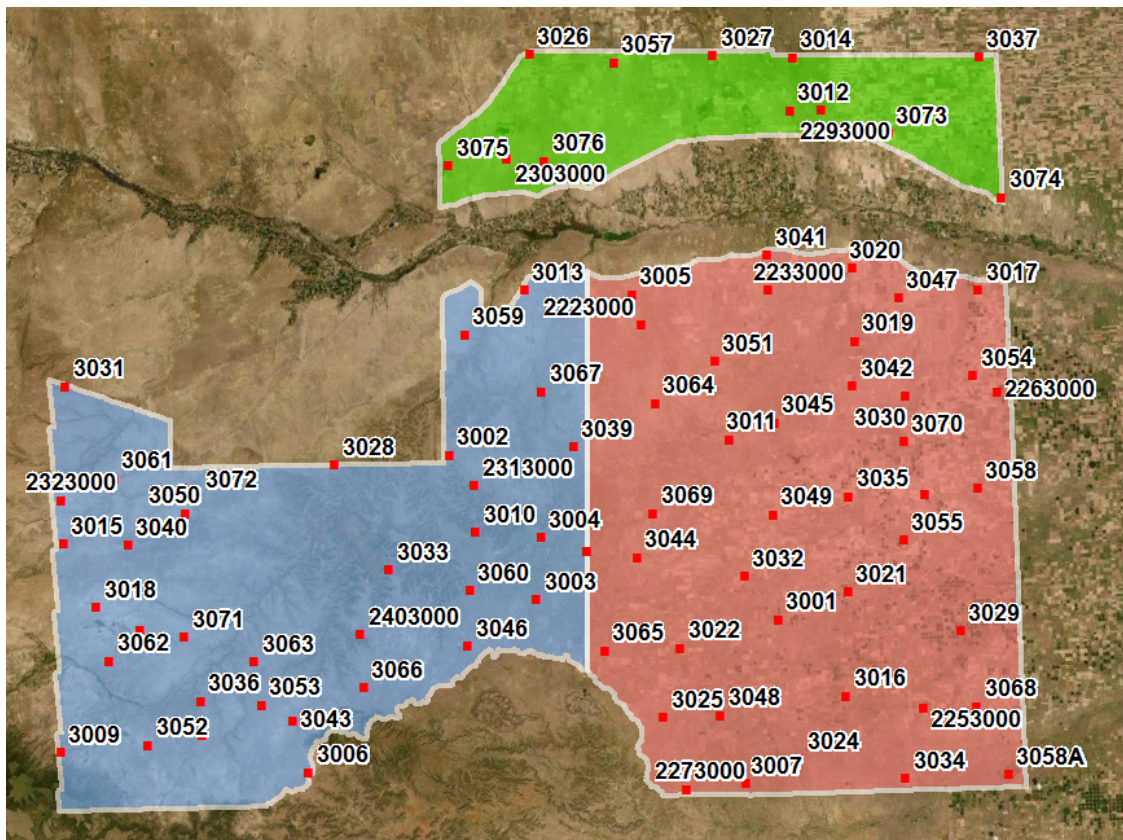
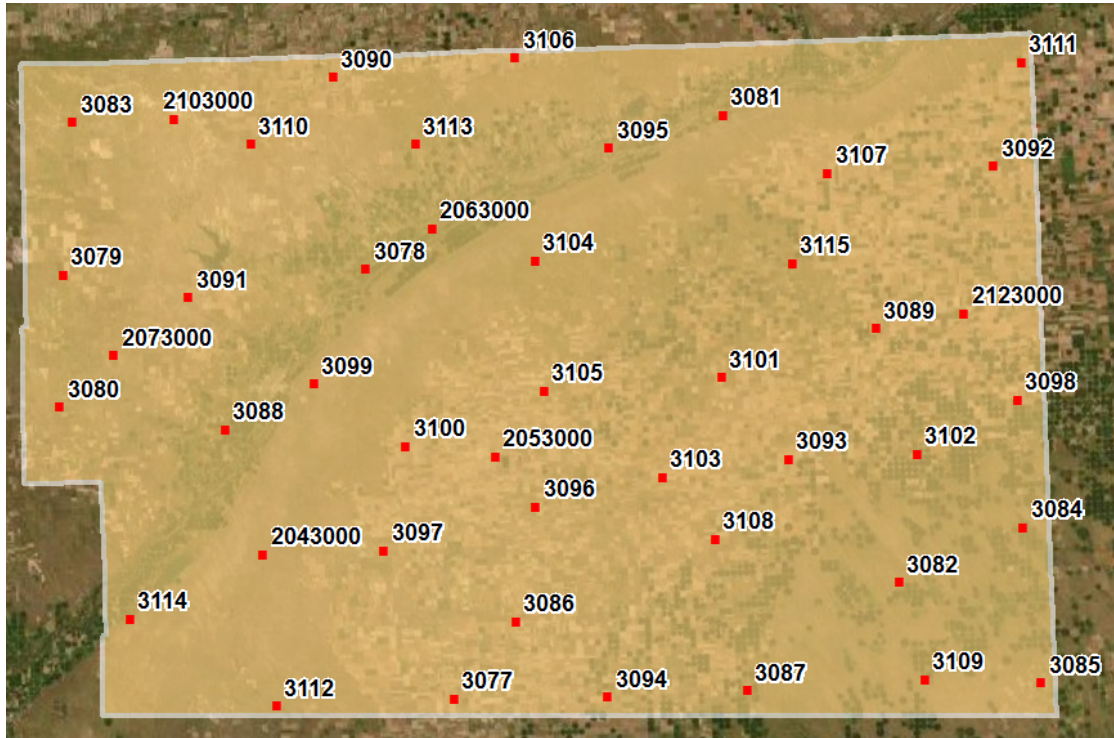
Colorado South Zone

Project Data Unit: U.S. Survey Foot
Vertical Accuracy Class tested: 10.0-cm
Elevation Calculation Method: Interpolated from TIN
LiDAR Classifications Included: 2/0 Ground (All)/0W

Check Points in Report: 88
Check Points with LiDAR Coverage: 88
Check Points (NVA): 88
Check Points (VVA): 0
Average Vertical Error Reported: 0.000 U.S. Survey Foot
Maximum (highest) Vertical Error Reported: 0.306 U.S. Survey Foot
Median Vertical Error Reported: -0.004 U.S. Survey Foot
Minimum (lowest) Vertical Error Reported: -0.383 U.S. Survey Foot
Standard deviation of Vertical Error: 0.132 U.S. Survey Foot
Skewness of Vertical Error: -0.192
Kurtosis of Vertical Error: 0.128
Non-vegetated Vertical Accuracy (NVA) RMSE(z): 3.988cm PASS
Non-vegetated Vertical Accuracy (NVA) at the 95% Confidence Level +/-: 7.816cm PASS
FGDC/NSSDA Vertical Accuracy at the 95% Confidence Level +/-: 7.816cm
Non-vegetated Vertical Accuracy (NVA) RMSE(z) (DEM): 4.143cm PASS
Non-vegetated Vertical Accuracy (NVA) at the 95% Confidence Level +/- (DEM): 8.120cm PASS

This data set was tested to meet ASPRS Positional Accuracy Standard for Digital Geospatial Data (2014) for a 10.0-cm RMSEz Vertical Accuracy Class. Actual NVA accuracy was found to be RMSEz = 3.988cm, equating to +/- 7.816cm at the 95% confidence level.

Lidar Control Point Layout



Lidar Filtering and Classification

The lidar filtering process encompasses a series of automated and manual steps to classify the boresighted point cloud data set. Each project represents unique characteristics in terms of cultural features (urbanized vs. rural areas), terrain type and vegetation coverage. These characteristics are thoroughly evaluated at the onset of the project to ensure that the appropriate automated filters are applied and that subsequent manual filtering yields correctly classified data. Data is most often classified by ground and “unclassified”, but specific project applications can include a wide variety of classifications including but not limited to buildings, vegetation, power lines, etc. MARS® software is used for the auto-filtering, manual filtering and QC of the classified data.

Merrick used the ASPRS LAS Specification Version 1.4 – R13, 15 July 2013, Point Data Record Format 6 for this project and classified the lidar point cloud in accordance with the following classification classes and bitflags. The following outlines project specific requirements.

- Class 1 = Unclassified
- Class 2 = Bare-earth Ground
- Class 7 = Low point (noise)
- Class 9 = Water
- Class 17 = Bridge decks
- Class 18 = High noise
- Class 20 = Ignored Ground (breakline proximity)
- Class 21 = Snow (if present and identifiable)
- Class 22 = Temporal exclusion (typically non-favored data in intertidal zones)

- Bitflags
 - Overlap: Any part of a swath that also is covered by any part of any other swath.
 - Withheld: Within the LAS file specification, a single bit flag indicating that the associated lidar point is geometrically anomalous or unreliable and should be ignored for all normal processes.

Merrick has developed several customized automated filters that are applied to the lidar data set based on project specifications, terrain, and vegetation characteristics. A filtering macro, which may contain one or more filtering algorithms, is executed to derive LAS files separated into the different classification groups as defined in the ASPRS classification table. The macros are tested in several portions of the project area to verify the appropriateness of the filters. Often, there is a combination of several filter macros that optimize the filtering based on the unique characteristics of the project. Automatic filtering generally yields a ground surface that is 85-90% valid, so additional editing (hand-filtering) is required to produce a more robust ground surface.

Lidar data is next taken into a graphic environment using MARS® to manually re-classify (or hand-filter) “noise” and other features that may remain in the ground classification after auto filter. A cross-section of the post auto-filtered surface is viewed to assist in the reclassification of non-ground data artifacts. The following is an example of re-classification of the non-ground points (elevated features) that need to be excluded from the true ground surface. Certain features such as berms, hilltops, cliffs and other features may have been aggressively auto-filtered and points will need to be re-classified into the ground classification. Data in the profile view displays non-ground (Unclassified, class 1) in grey and ground in brown/tan (Class 2). In **Figure 1**, a small building was not auto-filtered and needs to be manually re-classified. Note that **Figure 2** has the building points reclassified to unclassified from the true ground surface.

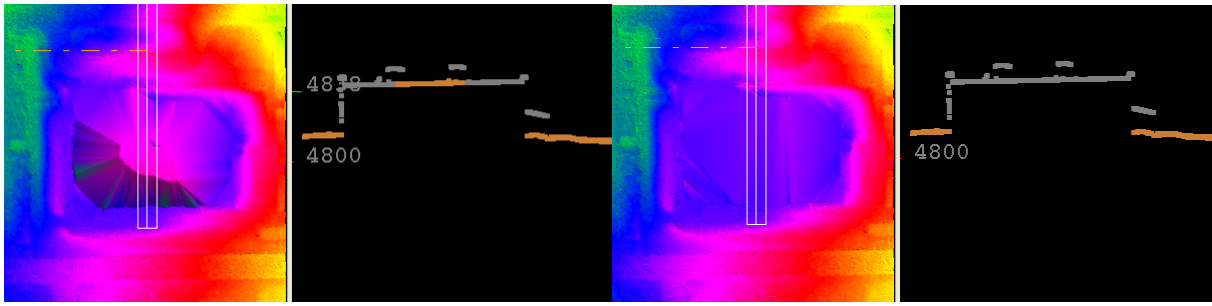


Figure 1

Figure 2

A combination of automated and semi-automated routines to classify buildings and vegetation. We expect that the classified buildings will meet a filtering criterion in the range of 90-95%.

At this point, individual lidar points from the original point cloud have now been parsed into separate classifications.

Filtered Lidar Checkpoint Report

After hand-filtering has been completed and quality checked, a Checkpoint Report is generated to validate that the accuracy of the ground surface is within the defined accuracy specifications. Each surveyed ground check point is compared to the lidar surface by interpolating an elevation from a Triangulated Irregular Network (TIN) of the surface. The MARS® derived report provides an in-depth statistical report, including an RMSE of the vertical errors; a primary component in most accuracy standards and a statistically valid assessment of the overall accuracy of the ground surface.

The below lidar check point reports provide statistics for 146 Colorado North Zone and 28 Colorado South Zone ground survey checkpoints used to validate the final filtered lidar surface.

Colorado North Zone

Vertical Accuracy Class tested: 10-cm

Check Points in defined project area (DPA):	146
Check Points with Lidar Coverage	146
Check Points with Lidar Coverage (NVA)	85
Check Points with Lidar Coverage (VVA)	61
Average Z Error (NVA)	0.003/0.010
Maximum Z Error (NVA)	0.136/0.446
Median Z Error (NVA)	0.008/0.026
Minimum Z Error (NVA)	-0.135/-0.442
Standard deviation of Vertical Error (NVA)	0.061/0.200
Skewness of Vertical Error (NVA)	-0.006
Kurtosis of Vertical Error (NVA)	-0.359
Non-vegetated Vertical Accuracy (NVA) RMSE(z) ¹	0.061/0.199 PASS
Non-vegetated Vertical Accuracy (NVA) at the 95% Confidence Level +/- ¹	0.119/0.391 PASS
FGDC/NSSDA Vertical Accuracy at the 95% Confidence Level +/-	0.119/0.391
Non-vegetated Vertical Accuracy (NVA) RMSE(z) (DEM) ²	0.061/0.200 PASS
Non-vegetated Vertical Accuracy (NVA) at the 95% Confidence Level (DEM) +/- ²	0.119/0.119 PASS
Vegetated Vertical Accuracy (VVA) at the 95th Percentile (DEM) +/- ²	0.278/0.913 PASS

This data set was tested to meet ASPRS Positional Accuracy Standard for Digital Geospatial Data (2014) for a 10-cm RMSEz Vertical Accuracy Class. Actual NVA accuracy was found to be RMSEz = 6.1cm, equating to +/- 11.9cm at the 95% confidence level. Actual VVA accuracy was found to be +/- 27.8cm at the 95th percentile.

¹ This value is calculated from TIN-based testing of the lidar point cloud data.

² This value is calculated from RAM-based grid testing of the lidar data. The grid cells are sized according to the Quality Level selected, and are defined in the USGS NGP Lidar Base Specification Version 1.3 (page 24, Table 6).

Colorado South Zone

Units: Meter (/US Survey Feet)

Vertical Accuracy Class tested: 10-cm

Check Points in defined project area (DPA):	281
Check Points with Lidar Coverage	281
Check Points with Lidar Coverage (NVA)	162
Check Points with Lidar Coverage (VVA)	119
Average Z Error (NVA)	-0.006/-0.018
Maximum Z Error (NVA)	0.101/0.330
Median Z Error (NVA)	-0.002/-0.007
Minimum Z Error (NVA)	-0.147/-0.481
Standard deviation of Vertical Error (NVA)	0.045/0.147
Skewness of Vertical Error (NVA)	-0.241
Kurtosis of Vertical Error (NVA)	0.169
Non-vegetated Vertical Accuracy (NVA) RMSE(z) ¹	0.045/0.148 PASS
Non-vegetated Vertical Accuracy (NVA) at the 95% Confidence Level +/- ¹	0.088/0.290 PASS
FGDC/NSSDA Vertical Accuracy at the 95% Confidence Level +/-	0.088/0.290
Non-vegetated Vertical Accuracy (NVA) RMSE(z) (DEM) ²	0.046/0.150 PASS
Non-vegetated Vertical Accuracy (NVA) at the 95% Confidence Level (DEM) +/- ²	0.089/0.089 PASS
Vegetated Vertical Accuracy (VVA) at the 95th Percentile (DEM) +/- ²	0.211/0.691 PASS

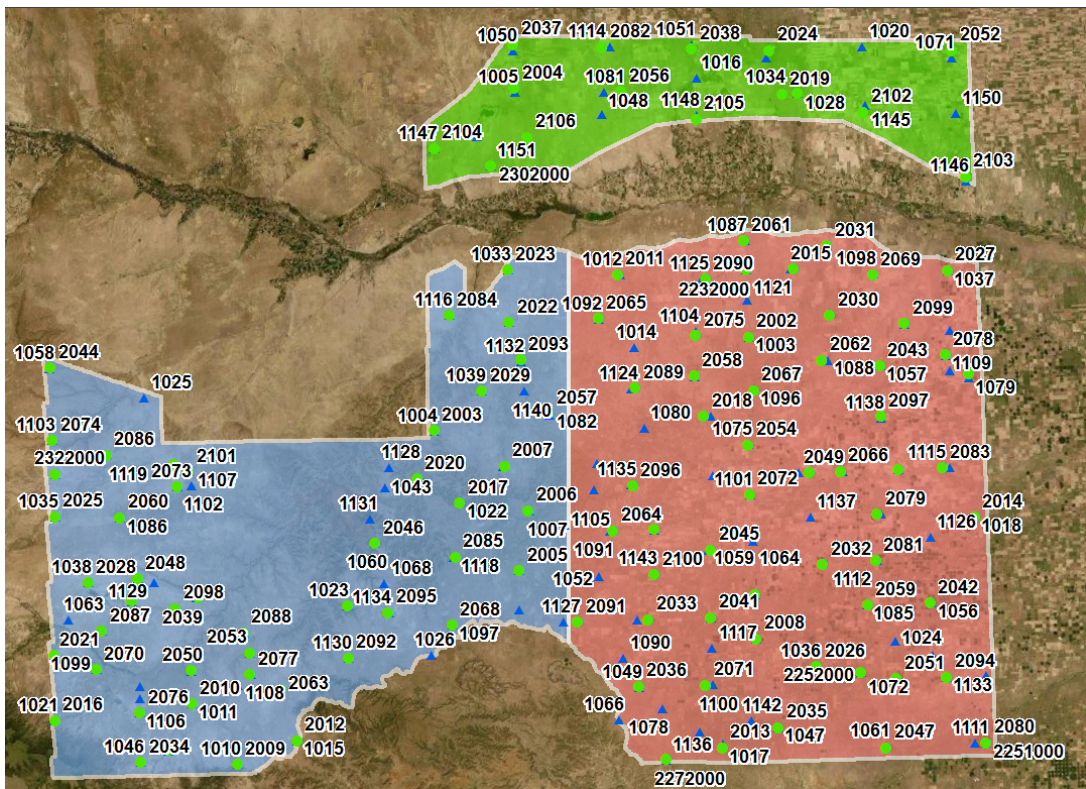
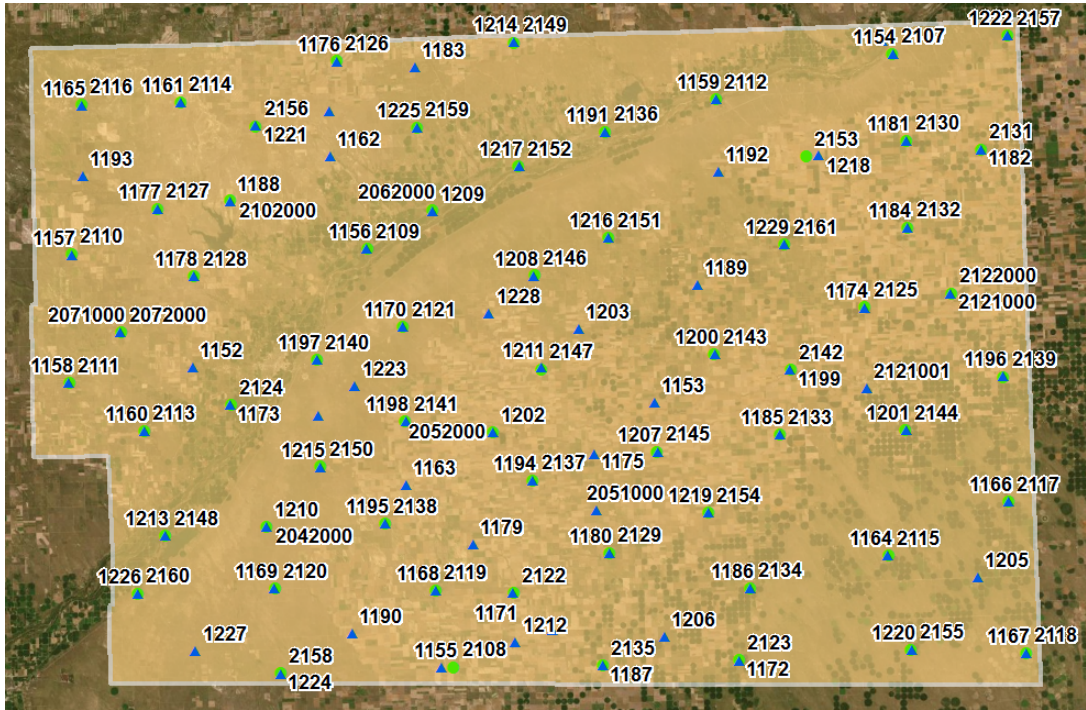
This data set was tested to meet ASPRS Positional Accuracy Standard for Digital Geospatial Data (2014) for a 10-cm RMSEz Vertical Accuracy Class. Actual NVA accuracy was found to be RMSEz = 4.5cm, equating to +/- 8.8cm at the 95% confidence level. Actual VVA accuracy was found to be +/- 21.1cm at the 95th percentile.

¹ This value is calculated from TIN-based testing of the lidar point cloud data.

² This value is calculated from RAM-based grid testing of the lidar data. The grid cells are sized according to the Quality Level selected, and are defined in the USGS NGP Lidar Base Specification Version 1.3 (page 24, Table 6).

Lidar Checkpoint Layout

- ▲ NVA
- VVA



Hydro-flattening Breakline Collection

Hydro- flattening breaklines are captured per the USGS National Geospatial Program Lidar Base Specification Version 1.3. Final hydro-flattened breaklines features are appropriately turned into polygons (flat elevations) and polylines (decreasing by elevation) and are used to reclassify ground points in water to Water (Class 9). The lidar points around the breaklines are reclassified to Ignored Ground (Class 10) based on predetermined buffer.

The next step in the process is the hydro-flattening breakline collection required for the development of the hydro-flattened DEMs. Merrick will capture hydro-flattening breaklines for waterbodies greater than or equal to two (≥ 2) acres; double-sided streams and rivers that are greater than or equal to one hundred feet ($\geq 100'$), and; any visible islands greater than or equal to one (≥ 1) acres. Criteria for Tidal Waters are assumed not applicable. No single-line streams or drainages will be collected, nor will any planimetric features that could be utilized as traditional breaklines. All downstream hydro-flattening breaklines require monotonicity (e.g., streams and rivers). Closed polygonal boundaries of water will maintain a fixed (i.e., flat) elevation. Breaklines are not required to conform to the EleHydro Breakline GIS Data Dictionary for this Task Order.

Linear hydrographic features

To collect hydrographic features, Merrick uses a methodology that directly interacts with the lidar bare-earth data to collect drainage breaklines. To determine the alignment of a drainageway, the technician first views the area as a TIN of bare-earth points using a color ramp to depict varying elevations. In areas of extremely flat terrain, the technician may need to determine the direction of flow based on measuring lidar bare-earth points at each end of the drain. The operator will then use the color ramped TIN to digitize the drainage in 2D with the elevation being attributed directly from the bare-earth LAS data. MARS® software has the capability of “flipping” views between the elevation TIN, Intensity and imagery, as necessary, to further assist in the determination of the drainage. All drainage breaklines are collected in a downhill direction. For each point collected, the software uses a five-foot (5') search radius to identify the lowest point within that proximity. Within each radius, if a bare-earth point is not found that is lower than the previous point, the elevation for subsequent point remains the same as the previous point. This forces the drain to always flow in a downhill direction. Waterbodies that are embedded along a drainageway are validated to ensure consistency with the downhill direction of flow.

This methodology may differ from those of other vendors in that Merrick relies on the bare-earth data to attribute breakline elevations. As a result of our methodology, there is no mismatch between lidar bare-earth data and breaklines that might otherwise be collected in stereo 3D as a separate process. This is particularly important in densely vegetated areas where breaklines collected in 3D from imagery will most likely not match (either horizontally or vertically), the more reliable lidar bare-earth data.

Merrick has the capability of “draping” 2D breaklines to a bare-earth elevation model to attribute the “z” as opposed to the forced downhill attribution methodology described above. However, the problem with this process is the “pooling” effect or depressions along the drainageway caused by a lack of consistent penetration in densely vegetated areas.

Criteria of linear hydrographic breaklines are as follows:

- Linear hydrographic features (e.g., visible streams, rivers, shorelines, canals, etc.) greater than or equal to one hundred feet ($\geq 100'$) wide will be captured as a double-lined polygon
 - linear hydrographic features must be flat and level bank-to-bank (perpendicular to the apparent flow centerline) with gradient following the immediately surrounding terrain
 - water surface edge must be at or just below the immediately surrounding terrain
 - streams should break at road crossings (e.g., culverts), and streams and rivers should not break at bridges

Waterbodies

Waterbodies are digitized from the color ramped TIN, similar to the process described above. The elevation attribute is determined as the technician collects the hydro feature by using the lowest bare-earth point within the polygon.

Criteria of waterbody breaklines are as follows:

- Waterbodies (e.g., lakes, ponds, reservoirs) greater than or equal to two (≥ 2) acres in size are surrounded by a water breakline (i.e., closed polygon)
 - waterbodies must be flat and level with a single elevation for every bank vertex
 - water surface edge must be at or just below the immediately surrounding terrain
 - long impoundments, such as reservoirs or inlets, whose water surface elevations drop when moving downstream should be treated as rivers

Color cycles provide a clear indication of where breaklines are to be collected, especially hydrographic breaklines. **Figure 3** demonstrates no breaklines, where **Figure 4** is breakline enforced displayed using color cycles within the MARS® software environment.

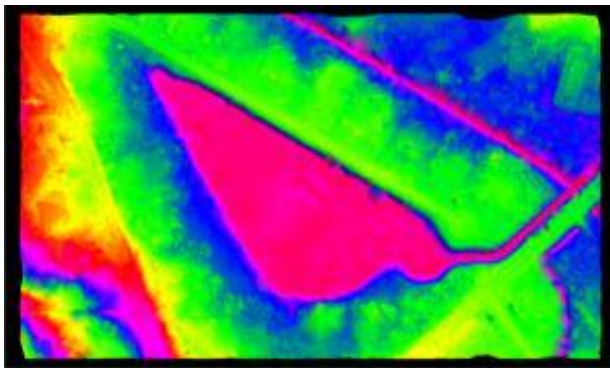


Figure 3

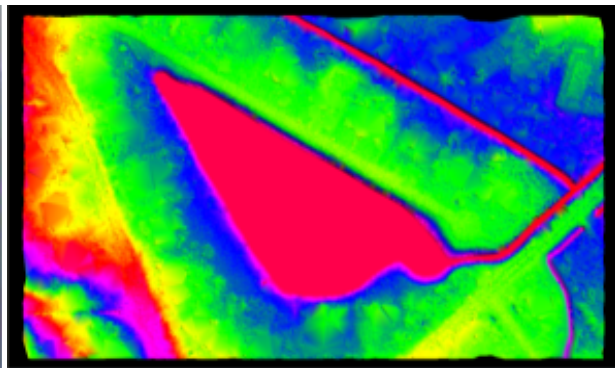


Figure 4

Bare-Earth DEM

Merrick exports the hydro-flattening breakline enforced Class 2 (ground) lidar points to a one-meter (1m) cell size, 32-bit format using MARS®, the DEMs are exported to the project tiling scheme. Projection information is applied that reflects the project requirements.

Intensity Images

Merrick exports all lidar points to a one-meter (1m) cell size 8-bit client desired format using MARS®, the intensity images are exported to the project tiling scheme and / or project-wide boundary. Projection information is applied that reflects the project requirements.

List of Deliverables

- ❖ Classified LiDAR point cloud
 - Fully compliant ASPRS LAS 1.4-R13, point record format 6
 - By tile
 - Intensity values normalized (rescaled) to 16-bit
 - FGDC-compliant metadata
- ❖ Hydro-flattened breaklines
 - Project-wide Esri feature class(es) or shapefile(s) for insertion into file geodatabase
 - PolylineZ – double-sided streams and rivers
 - PolygonZ – waterbodies
 - FGDC-compliant metadata
- ❖ Bare-earth Digital Elevation Model (DEM)
 - Two-foot (2') cell size 32-bit DEM in GeoTIFF format
 - Bare-earth (hydro-flattened)
 - Culverts will not be removed from the DEMs
 - Bridges will be removed from the DEMs
 - By tile
 - FGDC-compliant metadata
- ❖ Intensity Images
 - 2' cell size 8-bit 256-color gray scale in GeoTIFF format
 - By tile
 - FGDC-compliant metadata
- ❖ Control
 - Esri shapefile format
 - NVA, VVA and calibration control
 - FGDC-compliant metadata
- ❖ FGDC-compliant metadata (project level)
- ❖ Detailed Lidar Mapping / Project Report
 - Survey report
- ❖ Miscellaneous
 - Flight Index (feature class / file geodatabase)
 - Raw swath (Esri shapefile)
 - DPA and BPA boundaries (Esri shapefile)
 - 3,000' x 3,000' formatted tiles (Esri shapefile)
 - MARS® QC
 - ◆ PDF QC reports
 - ◆ Ancillary data files

Appendix 1

Following is a more detailed lidar calibration workflow description.

LIDAR CALIBRATION AND BLOCK LAS OUTPUT

Note: All figures represented on the following pages are for general illustration purposes, and are not examples derived from the project.

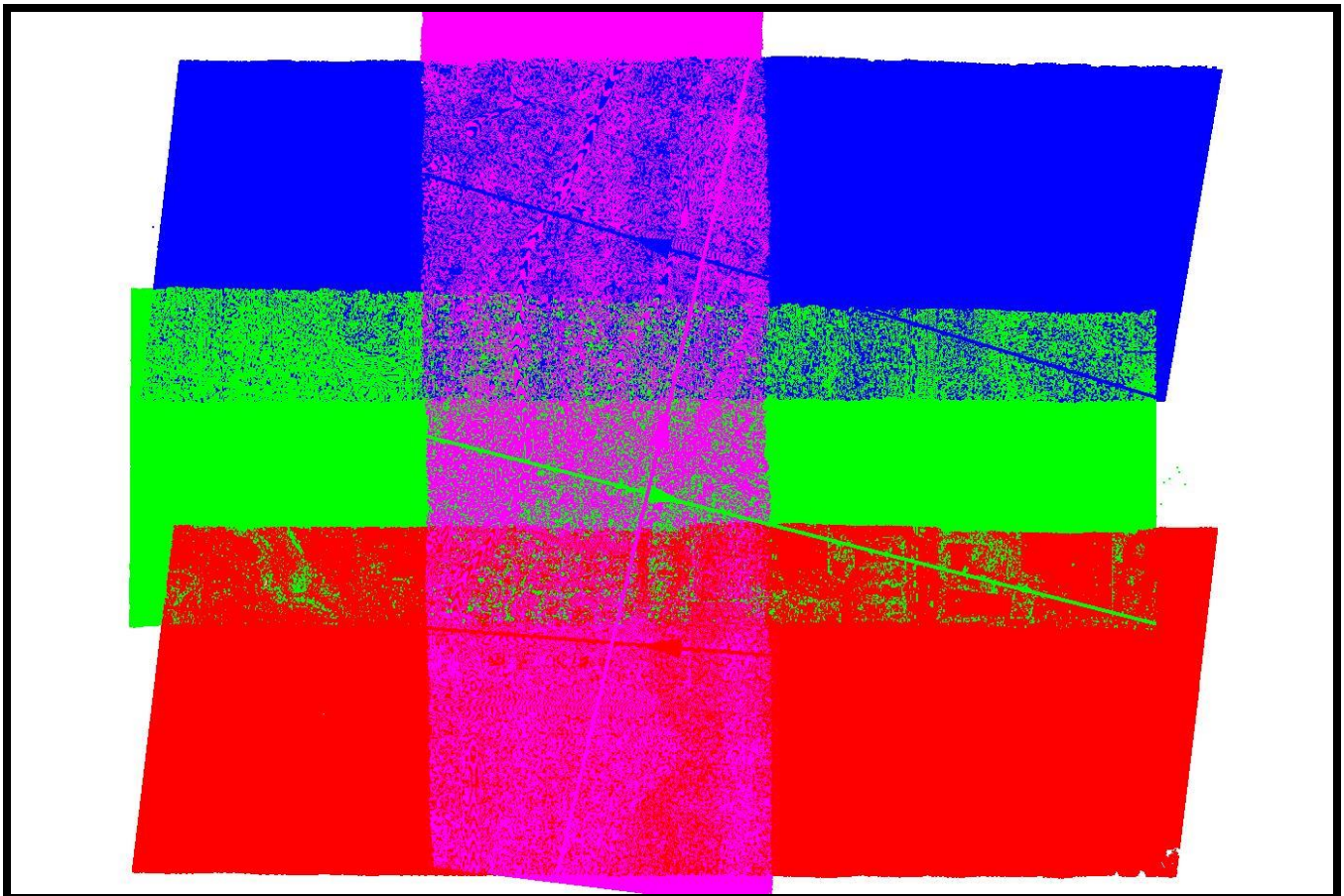
Initial Processing

Lidar data is output as LAS point data using Optech's Lidar Mapping Suite (LMS). LMS matches ground and roof planes plus roof lines to self-calibrate and correct system biases. These biases occur within the hardware of the laser scanning systems, within the Inertial Measurement Unit (IMU) and because of environmental conditions which affect the refraction of light. The systemic biases that are corrected for include scale, roll, pitch, and heading.

In addition to the self-calibration mode LMS runs a "production" mode which applies the self-calibration parameters and then analyzes each individual flight line and applies small adjustments to each line to tie overlapping lidar points even more tightly together.

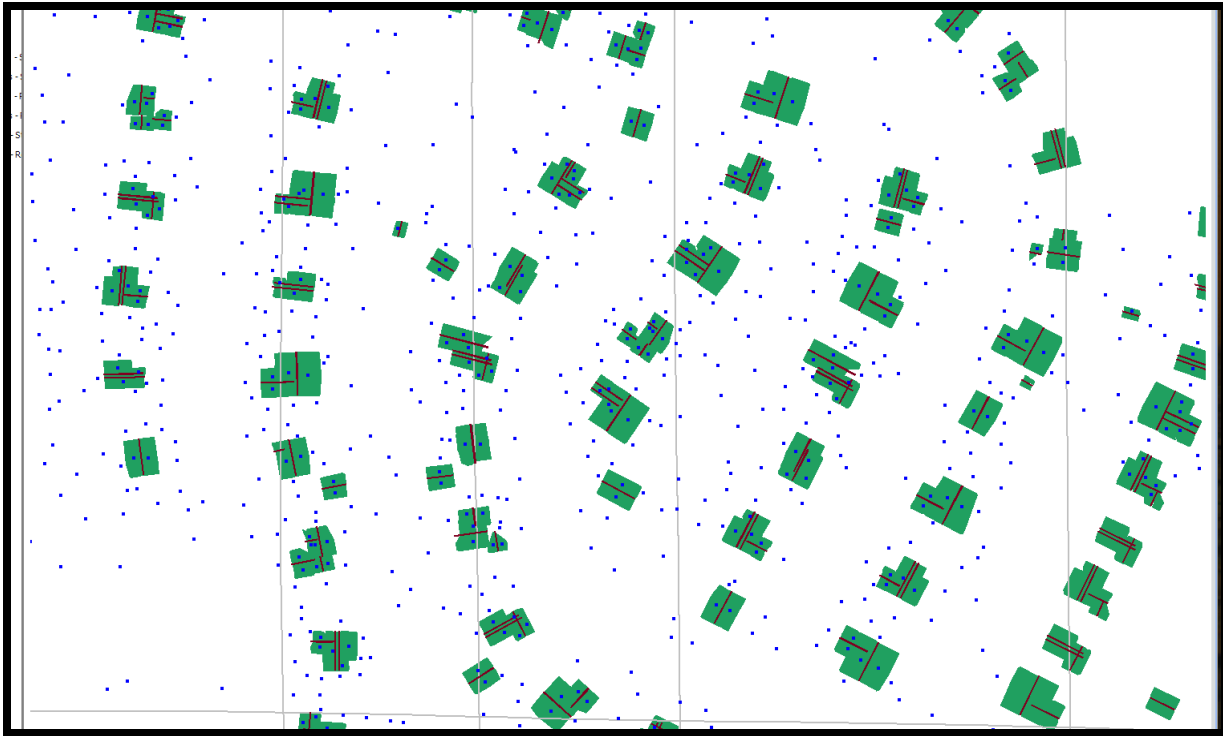
Boresight Self-Calibration Processing Procedures

An LMS boresight calibration is performed on an as-needed basis to correct scale, roll, pitch and heading biases. A minimum of three overlapping flights are flown in opposing directions with one cross flight.



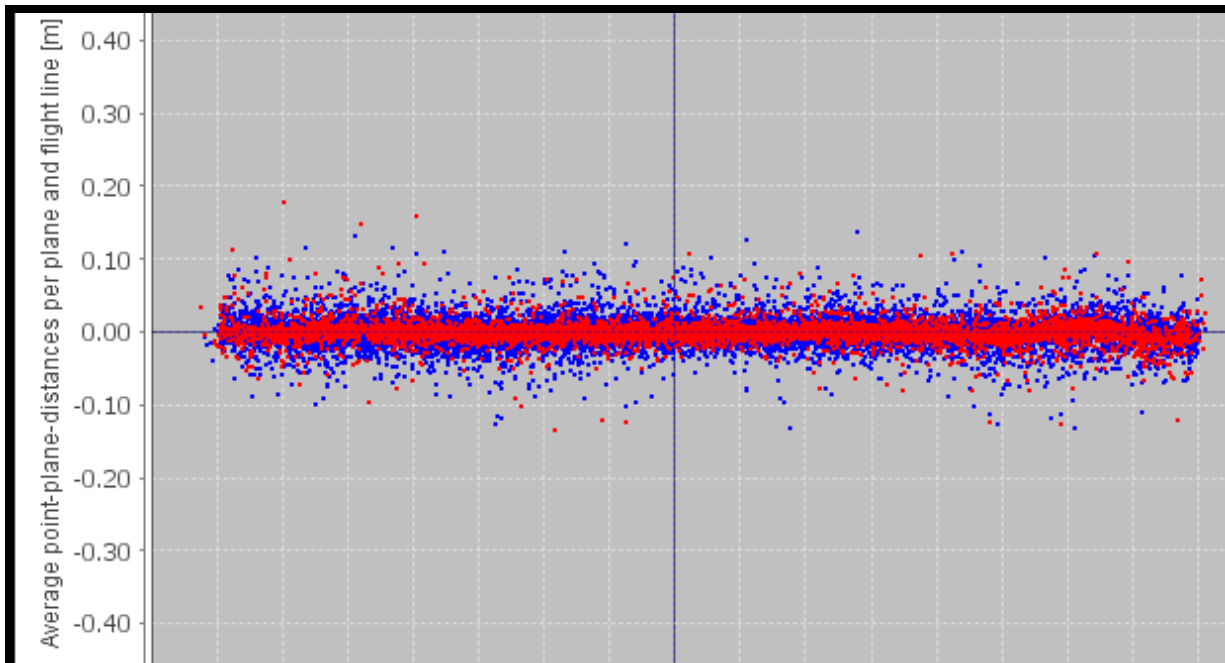
The Boresighting module frees scan angle scale, scan angle lag, XYZ boresight corrections and elevation position corrections while locking scan angle offset and XY position corrections.

The picked calibration site will have a good distribution of buildings for the self-calibration software to match ground planes, roof planes and roof lines.

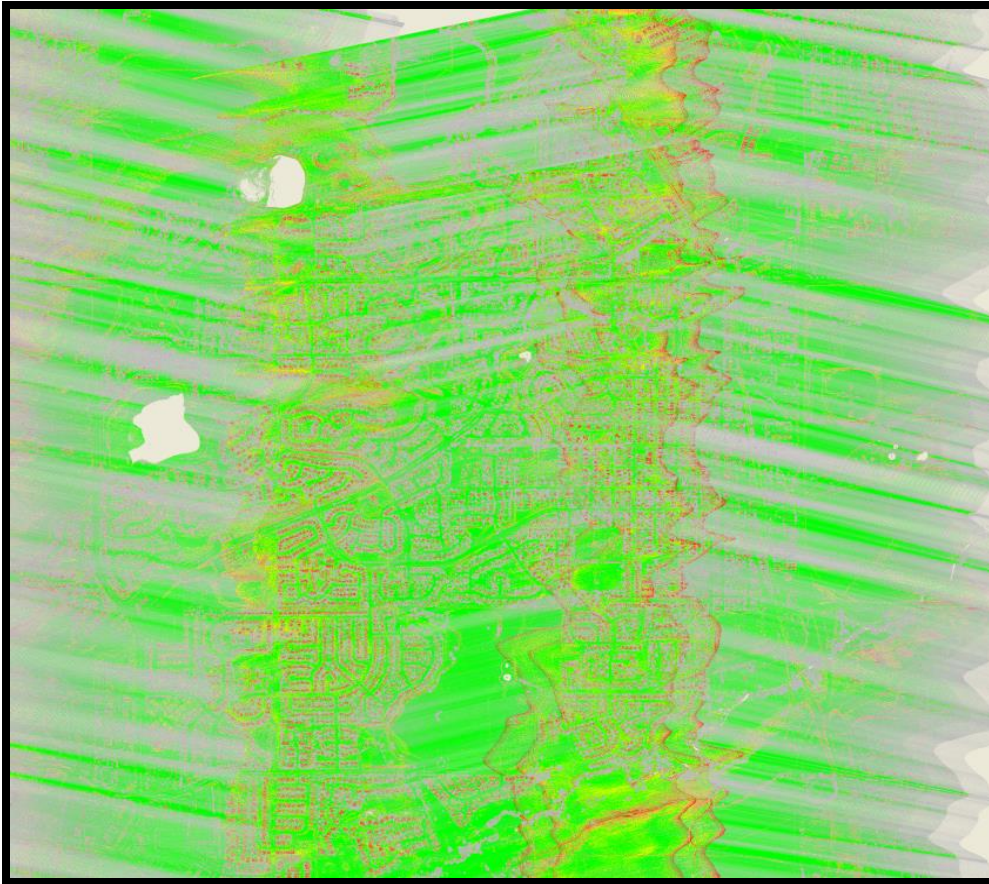


At the conclusion of the self-calibration run the data is quality checked with LMS plots

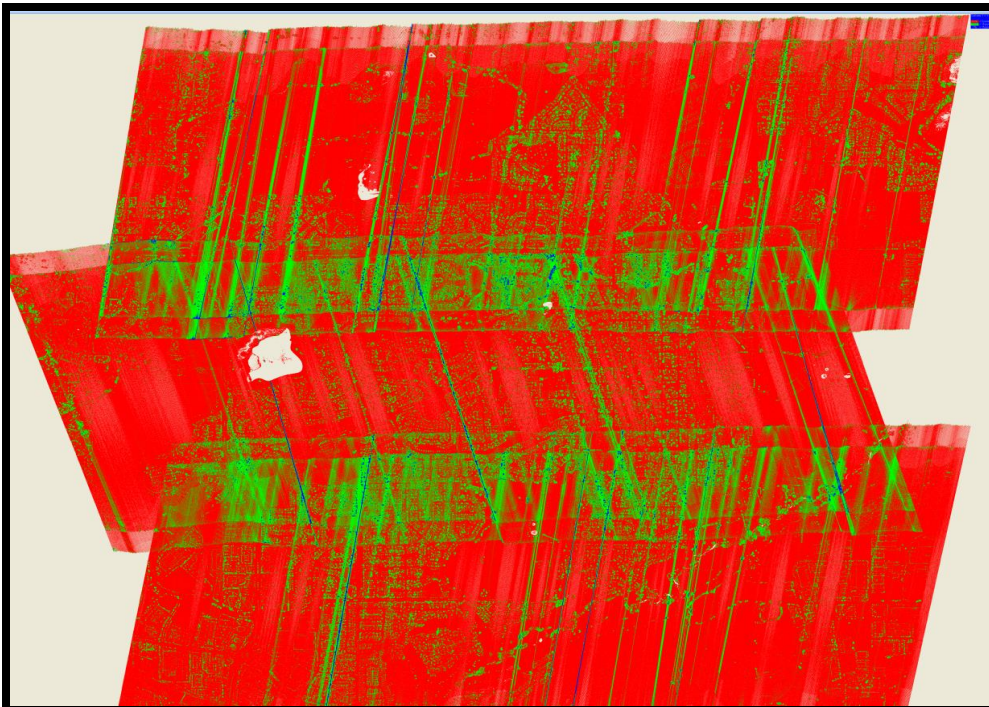
Plot of plane vertical distances from datum plane.



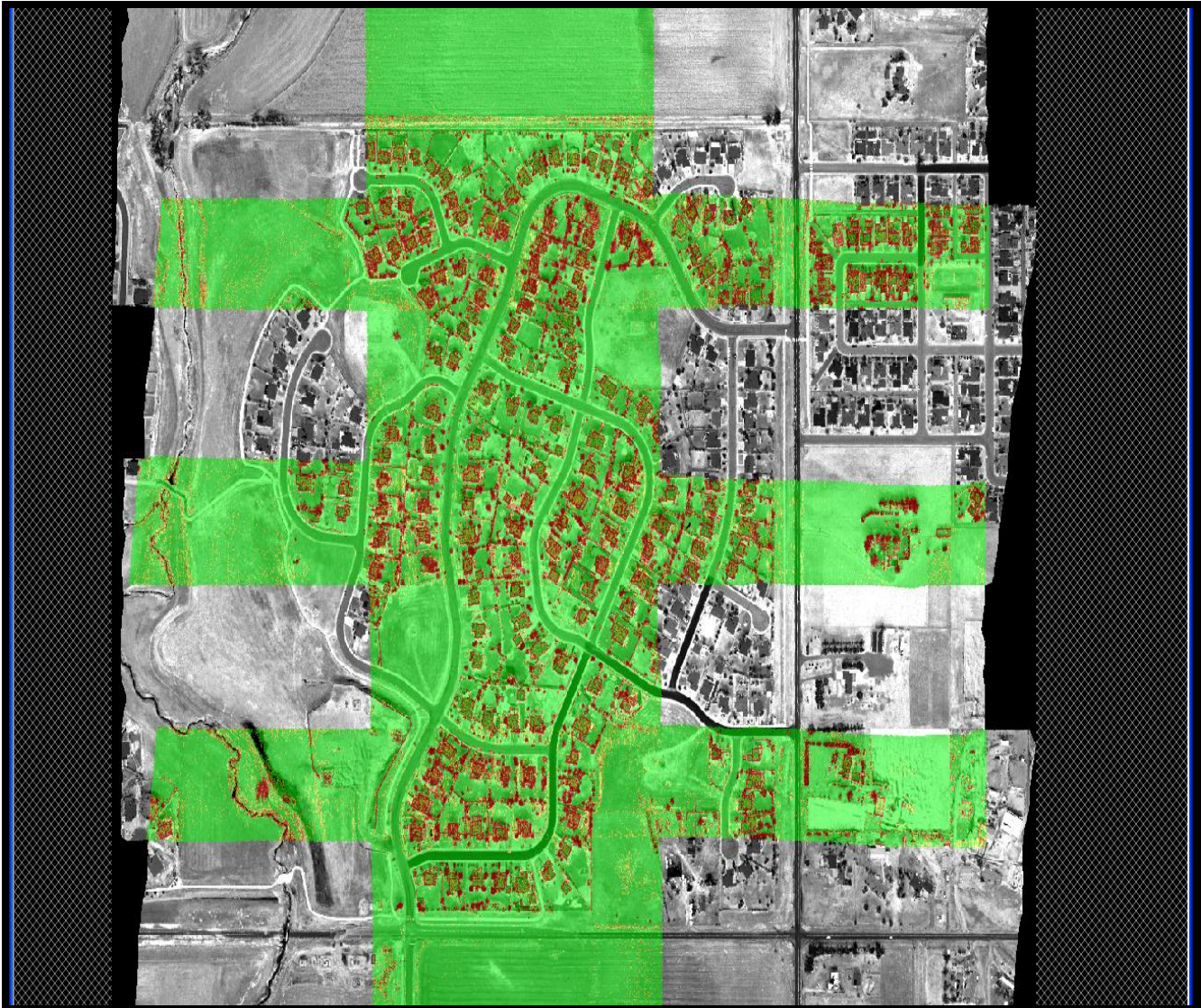
Plot of height differenced between flight lines. (Green=less than 5cm).



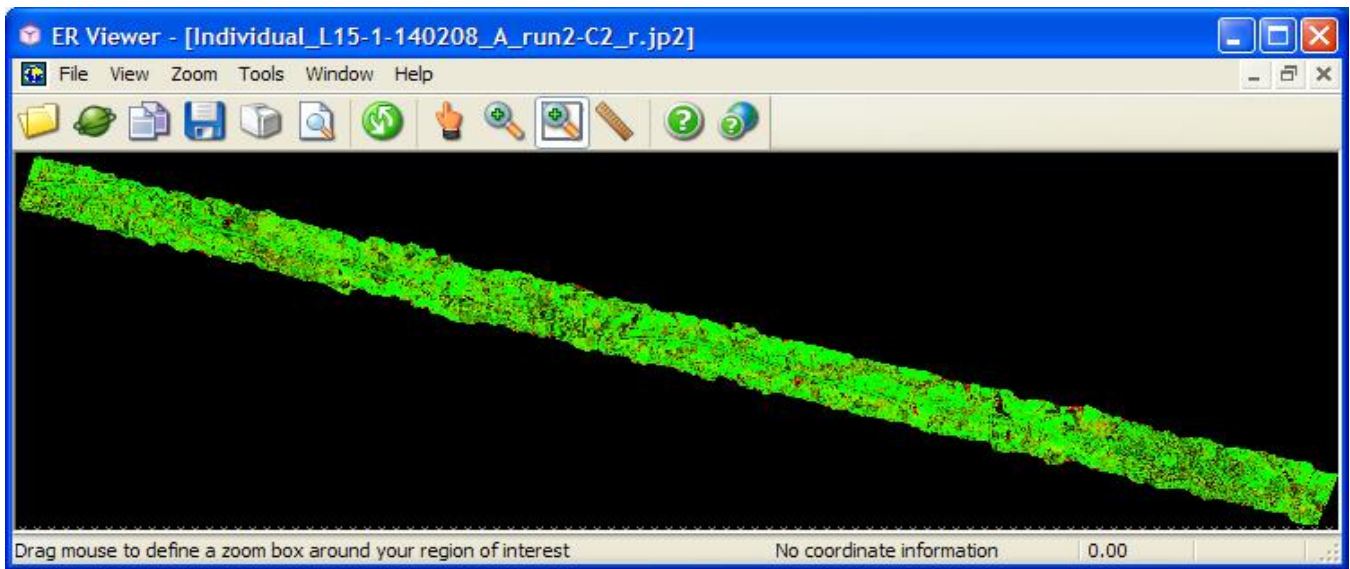
Plot of point densities. (Red=5-9 points per cell, green 10+ points per cell).



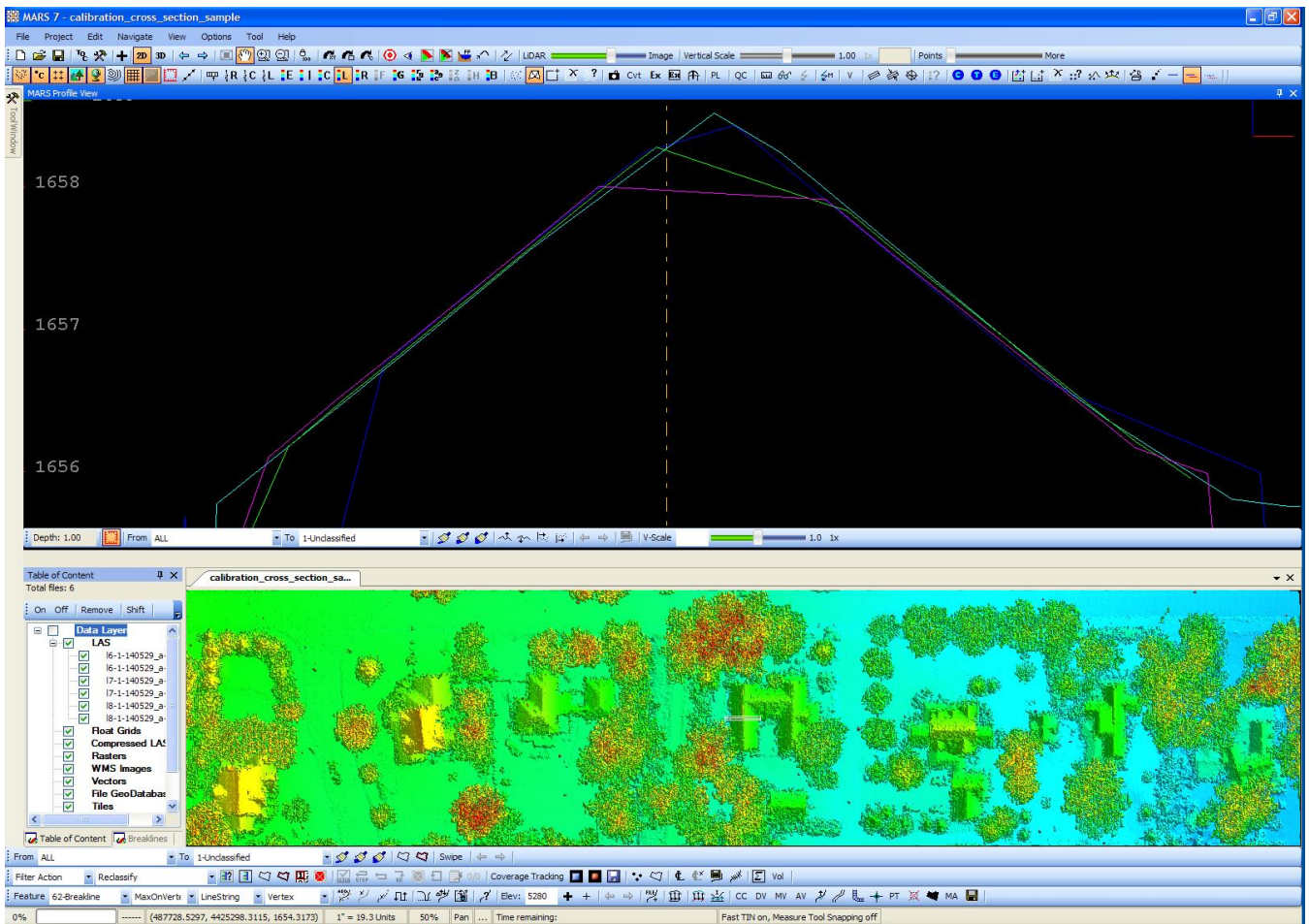
A Flight Line Separation Raster image is generated in Merrick Advanced Remote Sensing Software (MARS®), in this example ground returns from multiple flight lines that are fitting within 3 centimeters are colored green.



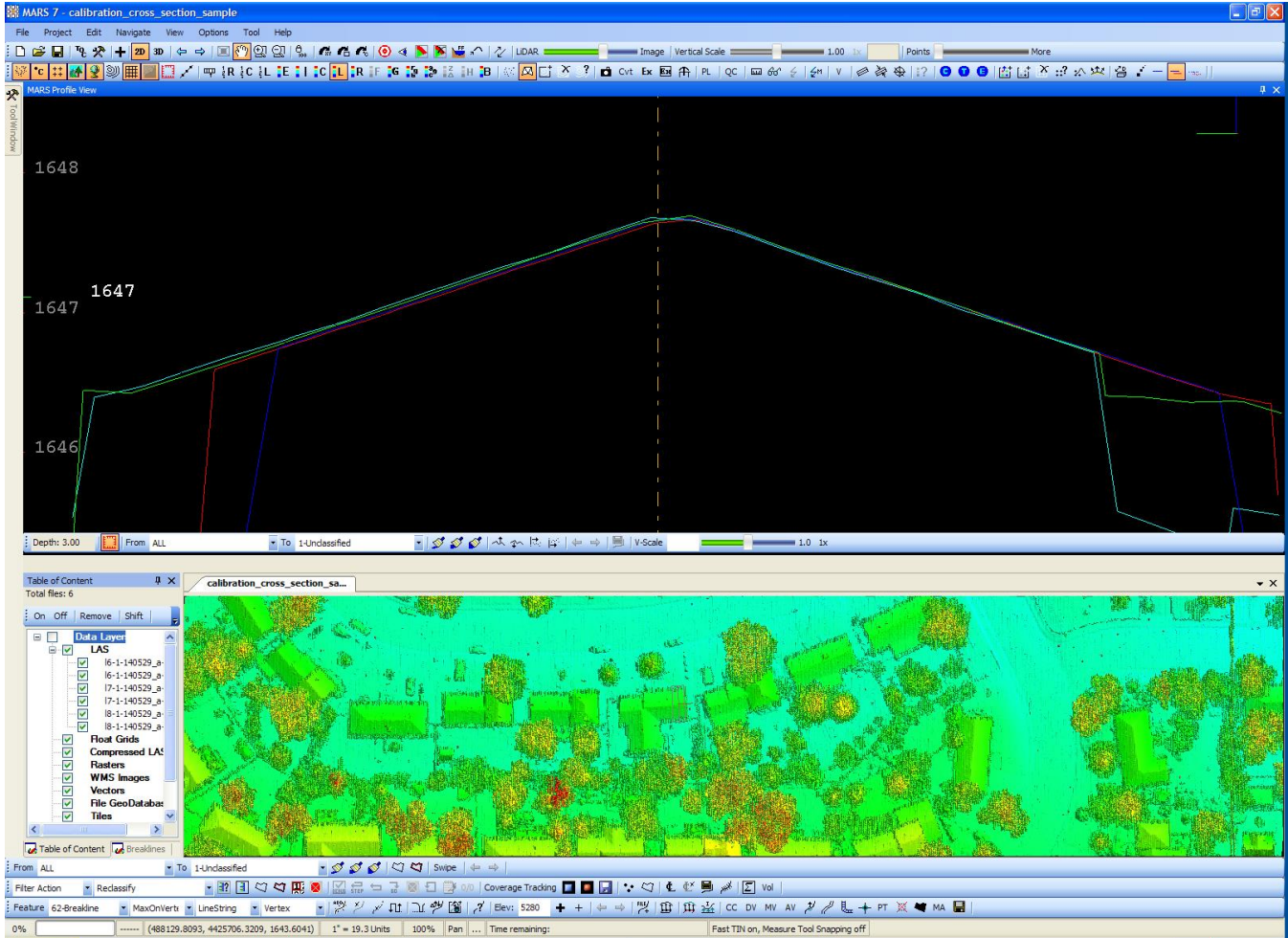
MARS® tests for internal relative vertical accuracy using inbound and outbound scan values. Again, Green is showing inbound and outbound scan data fitting to 3 centimeters.



Building cross sections are checked for good alignment. Pitch and heading are checked on roof planes parallel to the flight direction.



Roll and scale are checked on roof planes perpendicular to the flight direction.

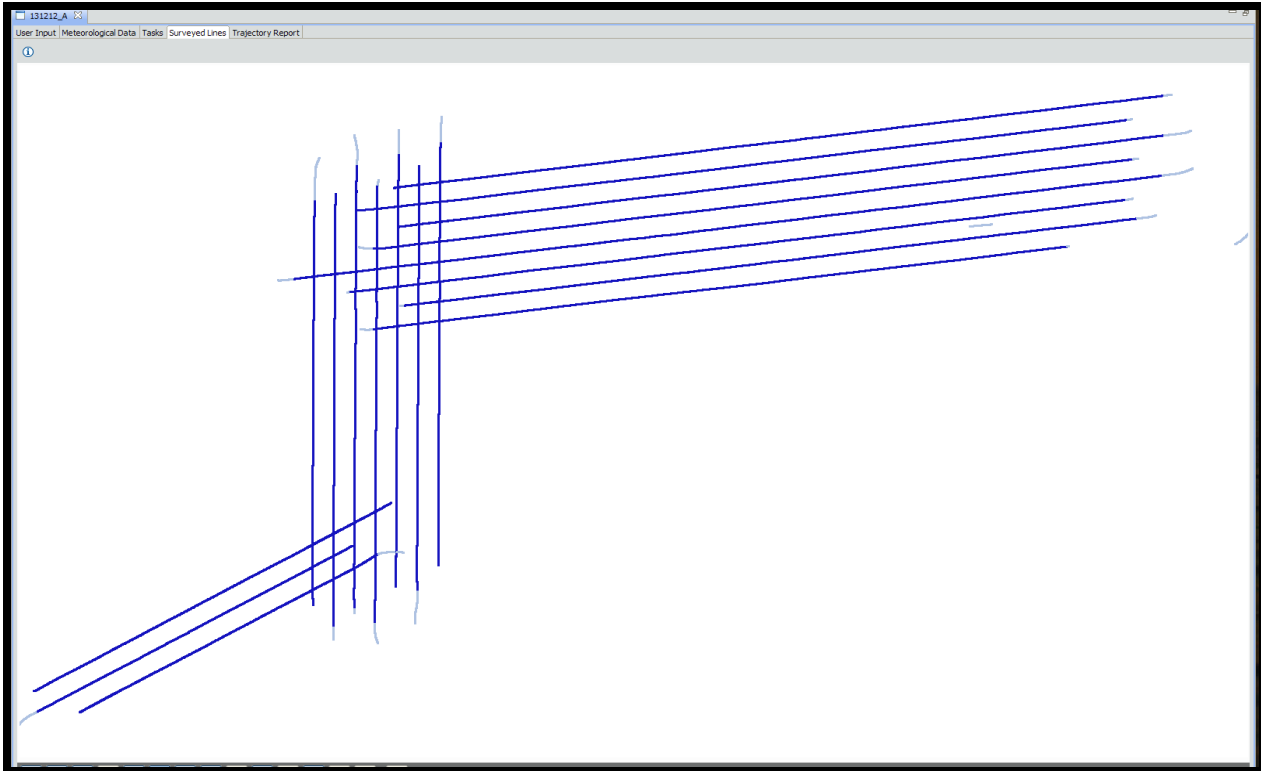


The LMS program outputs a "LCP" file with all the correction parameters. The calibration process may be run several times until the boresight adjustments are acceptable. When the boresight solution is acceptable the LCP file adjustments are saved and also applied to subsequent projects. Each new project is again analyzed and when the adjustment biases show too much drift a new boresight calibration is run. The LCP file may hold calibration tolerances for several projects.

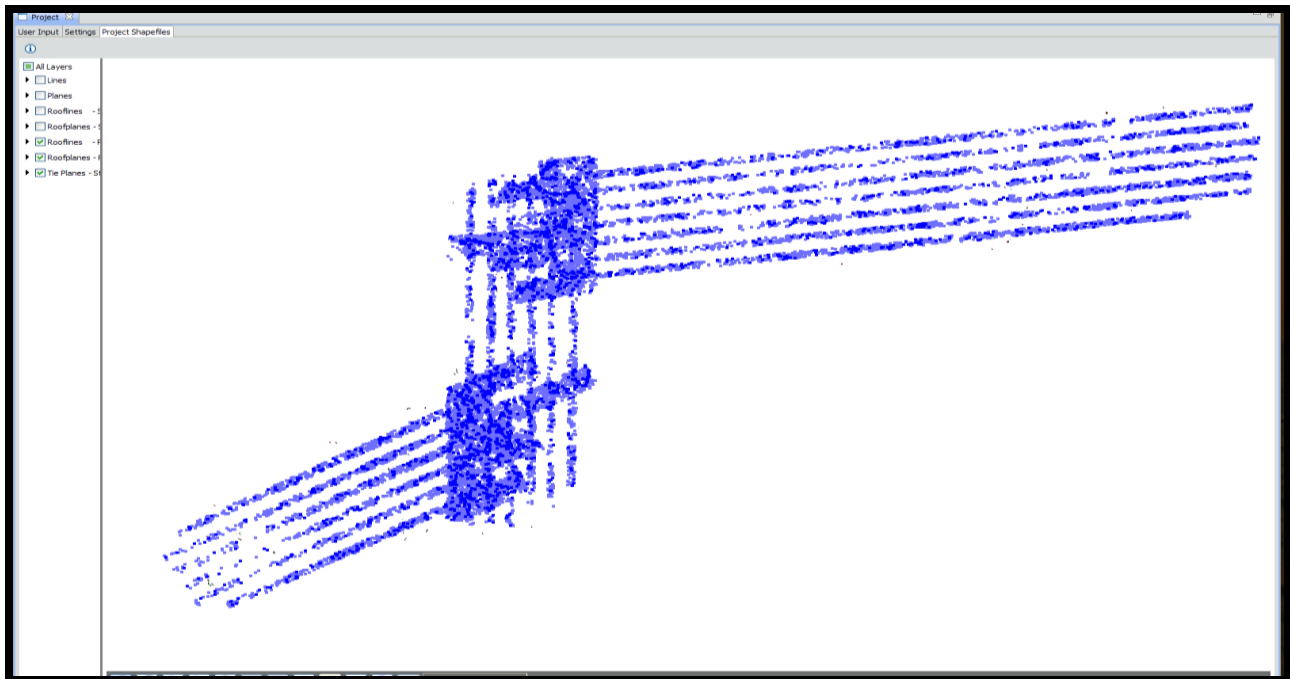
Block LAS Production Processing Procedures

The LMS production mode is run on each flight line to further tie the final lidar LAS flight line files tightly together. Production settings allow scan angle scale, scan angle lag to float and allows elevation to move slightly during flight line to flight line comparison thus further tying flight lines together. A cross flight with locked elevation data is used for controlling flight line elevations.

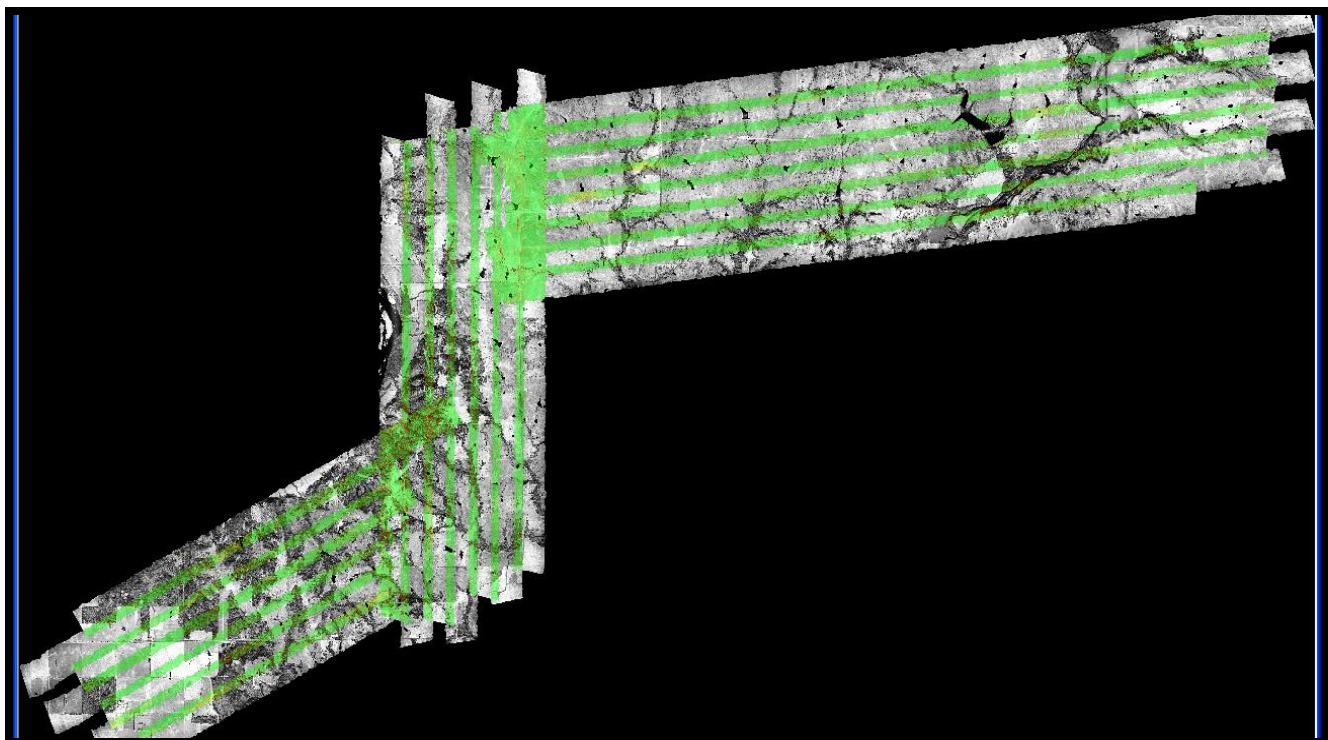
A block of data is selected to process with LMS production settings. Data collected during turns at the ends of flight lines is deselected (light blue lines).



As in self-calibration the LMS production program analyses ground, roof planes and rooflines. One cross flight is locked in elevation and all other lines are adjusted to it. Unlike the calibration site the distribution of roof planes is usually much less dense. Here matched ground tie planes are blue.

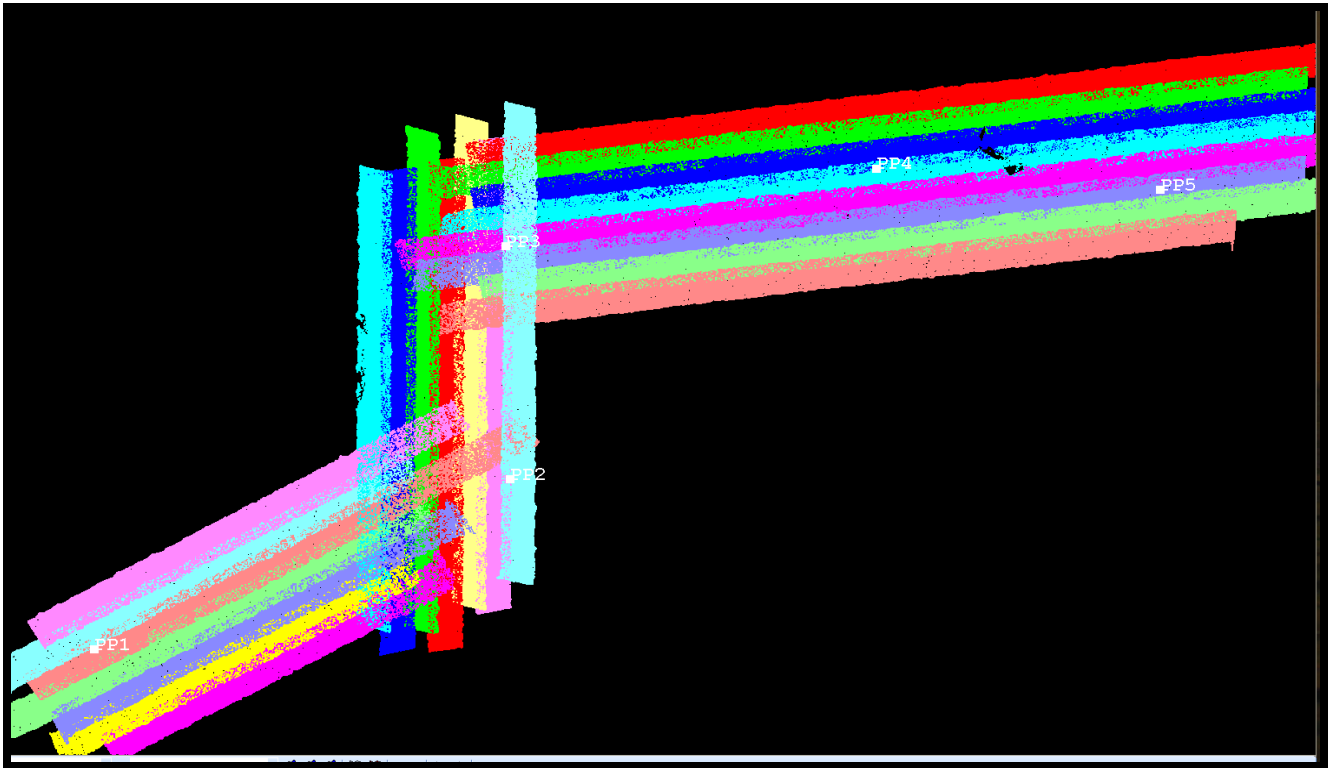


The same quality control outputs used to check self-calibrations are available to analyze the production run. Output plots are again available in LMS and cross sections plus a Flight Line Separation Raster are generated in MARS® to check coverage and quality.



Correcting the Final Elevation

After all the lines are tied together a ground control network is imported into MARS®. The ground control network may be pre-existing or collected by a licensed surveyor.



The next step is to match the ground control elevations to the lidar data set. A control report is run and the data set is shifted slightly to zero out the average elevation error and points checked for quality.

The final step before boresighted, leveled LAS files are ready for filtering is to run the MARS® QC Module on the block data. The Boresighted lidar QC Report outputs individual reports on Point Density, Nominal Pulse Spacing, Data Voids, Spatial Distribution, Scan Angles, Control Report, Flight Line Separation, Flight Line Overlap, Buffered Boundary, LAS Formats, Datums and Coordinates.

These reports are checked with the required specifications in the Project Management Plan.

Appendix 2

Following is a more detailed Survey report.



CWCB SOUTHEAST AND NORTHEAST COLORADO
GROUND CONTROL SURVEY REPORT

JOB NO. 65220329

DATE AUGUST 2019

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**CWCB
LIDAR MAPPING PROJECT
NORTHEAST AND SOUTHEAST COLORADO
GROUND CONTROL SURVEY REPORT**

I. INTRODUCTION

II. HORIZONTAL AND VERTICAL CONTROL

III. JOB SUMMARY AND EQUIPMENT

A. COORDINATES

NAD-83 (North American Datum of 1983) 2011 GEODETIC SYSTEM
COLORADO STATE PLANE NORTH AND SOUTH ZONES
NAVD-88 (North American Vertical Datum of 1988) GEOID 12B

B. BASE MAP AND SAMPLE OCCUPATION PHOTO

**C. EXISTING NGS (NATIONAL GEODETIC SURVEY) HORIZONTAL AND
VERTICAL CONTROL DATA SHEETS**

I. INTRODUCTION

This report summarizes the results of a ground control survey requested by the Colorado Water Conservation Board (CWCB). The survey was conducted in Northeastern and Southeastern Colorado for LIDAR (Light Detection and Ranging) mapping. The ground control field observations were performed by Merrick & Company commencing on July 23, 2019 through the completion date of August 30, 2019. Merrick surveyed approximately 565 checkpoints to verify confidence levels of the LIDAR datasets.

The project area for this report includes all or parts of 10 counties in Eastern Colorado being 12,035 square miles in area. The counties include Logan, Phillips, Sedgewick, Washington, and Yuma counties in Northeast Colorado. The Southeastern counties include Bent, Kiowa, Prowers Baca, and Las Animas. Merrick used Trimble RTX (A satellite-based service using worldwide continuously operating reference stations) to establish horizontal and vertical control constraints for the LIDAR acquisition. Merrick also tied 30 NGS (National Geodetic Survey) ground stations to verify horizontal and vertical control. RTX coordinates are observed in ITRF (2014). ITRF stands for International Terrestrial Reference Frame and the 2014 is a reference to the realization year. Coordinate values are converted into NAD83(2011) and NAVD88 values using the HTDP (Horizontal Time Dependent Positioning) program version 3.2.7 published by the National Geodetic Survey.

II. HORIZONTAL AND VERTICAL CONTROL

The project coordinate systems are Colorado State Plane North and Colorado State Plane South based on NAD83(North American datum of 1983), adjustment of 2011. The geodetic network was tied to CORS (Continuously Operating Reference Stations) via RTX and NGS ground stations. The following existing NGS control points were used as horizontal checks to control this survey.

NGS Primary Horizontal Control Checkpoints		
PT# (NGS NAME)	RECORD POSITION NAD-83 (2011)	
	LATITUDE	LONGITUDE
A 15	40°35'03.98345"N	102°18'07.39721"W
A 17	40°28'57.44062"N	103°21'04.79801"W
A 442	40°40'34.12822"N	103°09'59.08832"W
A 443	40°55'24.63181"N	102°33'44.57381"W
B 439	40°55'17.18123"N	103°06'56.69026"W
CUB	40°58'29.48382"N	102°19'10.24893"W
D 73	39°47'13.73087"N	102°42'24.35569"W
G 15	40°44'56.23006"N	102°17'12.22713"W
PAT AZ MK	40°57'26.16221"N	102°25'41.07195"W
R 57 RESET	39°44'25.11799"N	103°39'01.66349"W
S 70	39°48'46.75317"N	103°35'34.25794"W
U 59	40°09'42.04598"N	102°43'05.43227"W
5544	37°27'34.02925"N	104°12'22.06707"W
5629	37°21'37.51514"N	104°15'07.26287"W
D 435	37°04'48.00145"N	102°34'44.34192"W
E 78	38°28'18.79723"N	102°05'15.21376"W
F 435	37°08'56.46507"N	102°36'56.47663"W
J 37	38°31'05.96338"N	102°47'09.20369"W
K 435	37°14'10.29329"N	102°36'54.61137"W
L 433	38°01'51.56324"N	102°36'51.46896"W
N 37	38°26'25.06970"N	102°43'50.67278"W
N 432	38°02'48.48738"N	103°22'18.43560"W
N 433	37°57'18.72256"N	102°36'45.63489"W
P 69	37°34'45.07883"N	104°02'46.79713"W
R 435	37°22'02.70873"N	102°36'54.32586"W
Y 439	38°05'35.55910"N	102°31'12.50687"W
Z 432	38°05'06.59709"N	102°37'57.54342"W

**NGS Primary Control
Horizontal NAD-83 (2011)
Comparisons: Record Versus Measured**

PT# (NGS NAME)	NORTH (US FT)	EAST (US FT)
A 15	+0.12	+0.07
A 17	+0.29	-0.09
A 442	+0.25	+0.06
A 443	+0.17	+0.08
B 439	+0.10	+0.06
CUB	+0.29	+0.04
D 73	+0.14	+0.04
G 15	+0.09	+0.02
PAT AZ MK	+0.16	+0.09
R 57 RESET	+0.12	+0.08
S 70	+0.18	+0.08
U 59	+0.05	+0.01
5544	+0.15	+0.12
5629	+0.23	+0.07
D 435	+0.23	+0.01
E 78	+0.22	+0.04
F 435	+0.23	+0.03
J 37	+0.22	+0.03
K 435	+0.19	+0.09
L 433	+0.14	+0.09
N 37	+0.22	+0.07
N 432	+0.19	+0.19
N 433	+0.20	-0.02
P 69	+0.25	+0.09
R 435	+0.13	-0.06
Y 439	+0.11	+0.05
Z 432	+0.24	+0.12

NGS Primary Vertical Control checks		
Comparisons: Record Versus Measured		
PT# (NGS NAME)	RECORD	MEASURED
	NAVD 88 elevation in US FT	Difference in US FT
A 15	3737.82	+0.07
A 17	4037.35	+0.26
A 442	3901.45	+0.09
A 443	3599.08	+0.06
B 439	4252.66	-0.07
CUB	3520.65	-0.03
D 73	4277.27	-0.05
G 15	3773.45	-0.03
PAT AZ MK	3540.32	-0.33
R 57 RESET	4934.59	+0.70
S 70	4720.16	+0.24
U 59	4095.48	+0.02
5544	5550.57	-0.09
5629	5635.26	+0.02
D 435	4321.97	-0.01
E 78	3934.07	+0.07
F 435	4394.15	+0.11
J 37	4252.83	+0.04
J 38	3885.35	-0.11
K 435	4418.69	+0.04
L 433	3726.02	+0.06
N 37	4146.46	-0.05
N 432	4036.02	-0.03
N 433	3825.38	-0.12
P 69	5212.12	-0.15
R 432	3917.12	-0.13
R 435	4425.29	-0.05
Y 439	3571.10	+0.04
Z 432	3621.65	-0.09
Z 441	3549.75	-0.04

III. JOB SUMMARY

The coordinate systems are Colorado North State Plane and Colorado South State Plane the units are in US feet. The projection parameters are as follows:

PROJECTION: LAMBERT CONFORMAL CONIC TWO PARALLEL
ZONE: COLORADO NORTH
LATITUDE OF ORIGIN = N 39° 20' 00.000000"
LONGITUDE OF ORIGIN = W 105° 30' 00.000000"
FALSE NORTHING = 1000000.000 FT
FALSE EASTING = 3000000.000 FT
PARALLEL 1 = 40° 47' 00.000000"
PARALLEL 2 = 39° 43' 00.000000"

PROJECTION: LAMBERT CONFORMAL CONIC TWO PARALLEL
ZONE: COLORADO SOUTH
LATITUDE OF ORIGIN = N 36° 40' 00.000000"
LONGITUDE OF ORIGIN = W 105° 30' 00.000000"
FALSE NORTHING = 1000000.000 FT
FALSE EASTING = 3000000.000 FT
PARALLEL 1 = 38° 26' 00.000000"
PARALLEL 2 = 37° 14' 00.000000"

The data collected was converted and checked with published ground station coordinates. The specifications for accuracy with RTX are 2 centimeters horizontally and 5 centimeters vertically.

Satellite data was collected using two Trimble R10 receivers. The coordinates were processed using Trimble Business Center (Version 5.0).

Existing NGS published control stations were surveyed to assure that there were no discrepancies in the field observation data. Close examinations of the residuals showed no distortions in orientation or scale.

CWCB NE COLORADO CHECKPOINTS

65220329

AUGUST 2019

PT#	NAD83(2011)		ELLIPSOID	COLORADO NORTH ZONE		NAVD 88	CODE	NOTE
	LATITUDE	LONGITUDE	HEIGHT	NORTHING	EASTING	ELEVATION		
			US FT	US FT	US FT	US FT		
1152	40°37'31.96333"N	103°20'05.43300"W	4137.21	1478065.15	3600952.80	4201.43	LIPT	NVA
1153	40°34'09.87290"N	102°37'36.72264"W	3992.94	1463206.82	3798057.87	4060.41	LIPT	NVA
1154	40°58'03.91310"N	102°14'33.52668"W	3467.42	1611928.63	3899406.18	3534.66	LIPT	NVA
1155	40°15'58.45018"N	102°57'57.71304"W	4294.80	1349934.07	3707032.74	4362.22	LIPT	NVA
1156	40°45'31.14666"N	103°03'46.62144"W	3770.06	1528499.15	3675067.59	3835.27	LIPT	NVA
1157	40°45'35.30531"N	103°31'00.88140"W	4327.46	1525785.79	3549333.41	4390.43	LIPT	NVA
1158	40°36'35.21419"N	103°31'29.49492"W	4381.75	1471092.35	3548349.40	4445.28	LIPT	NVA
1159	40°55'16.69519"N	102°31'04.30140"W	3515.69	1592340.48	3824013.99	3581.77	LIPT	NVA
1160	40°33'05.95267"N	103°24'37.74780"W	4192.42	1450649.11	3580595.85	4256.67	LIPT	NVA
1161	40°56'06.57953"N	103°20'36.41424"W	4368.32	1590777.61	3595821.55	4431.53	LIPT	NVA
1162	40°52'06.10982"N	103°06'54.74736"W	3967.00	1568063.54	3659520.89	4031.63	LIPT	NVA
1163	40°28'54.24870"N	103°00'40.02300"W	4442.93	1428052.29	3692252.90	4508.92	LIPT	NVA
1164	40°22'53.67788"N	102°16'38.28828"W	3664.07	1398161.52	3897600.97	3734.77	LIPT	NVA
1165	40°56'03.01754"N	103°29'48.23952"W	4247.28	1589423.84	3553486.98	4309.97	LIPT	NVA
1166	40°26'24.70927"N	102°05'23.94384"W	3523.88	1421451.99	3948927.61	3595.14	LIPT	NVA
1167	40°15'39.21293"N	102°04'15.61980"W	3518.47	1356385.06	3956731.60	3590.99	LIPT	NVA
1168	40°21'24.10222"N	102°58'12.64872"W	4247.85	1382840.90	3704935.45	4314.59	LIPT	NVA
1169	40°21'49.42786"N	103°13'01.38108"W	4283.15	1383536.02	3636095.03	4348.84	LIPT	NVA
1170	40°39'59.66366"N	103°00'38.58984"W	4121.28	1495367.50	3690473.52	4186.79	LIPT	NVA
1171	40°21'05.16766"N	102°51'10.28088"W	4148.72	1381880.03	3737675.64	4216.22	LIPT	NVA
1172	40°15'51.87114"N	102°30'34.58160"W	3838.09	1353235.58	3834363.28	3908.23	LIPT	NVA
1173	40°34'47.48268"N	103°16'39.06516"W	3956.41	1461818.78	3617277.39	4021.15	LIPT	NVA
1174	40°40'20.55205"N	102°18'00.21600"W	3710.08	1503803.27	3887443.00	3778.46	LIPT	NVA
1175	40°30'40.91317"N	102°43'18.32808"W	4101.98	1441231.20	3772371.75	4169.29	LIPT	NVA
1176	40°58'43.42649"N	103°06'05.40144"W	4353.89	1608363.26	3662223.20	4418.14	LIPT	NVA
1177	40°48'39.42220"N	103°22'57.21168"W	4106.36	1545274.41	3586098.57	4169.82	LIPT	NVA
1178	40°43'53.29153"N	103°19'46.22844"W	4130.24	1516680.57	3601488.66	4194.11	LIPT	NVA

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	LATITUDE	LONGITUDE	HEIGHT	NORTHING	EASTING	ELEVATION		
			US FT	US FT	US FT	US FT		
1179	40°24'33.35900"N	102°54'43.15824"W	4279.20	1402452.17	3720587.20	4345.95	LIPT	NVA
1180	40°23'41.34494"N	102°42'11.37276"W	4006.76	1398956.73	3778879.54	4074.95	LIPT	NVA
1181	40°51'57.14420"N	102°13'40.44252"W	3682.30	1574983.42	3904845.25	3749.81	LIPT	NVA
1182	40°51'06.01272"N	102°06'46.99332"W	3599.18	1571004.80	3936786.73	3667.37	LIPT	NVA
1183	40°58'08.55120"N	102°58'52.07556"W	4248.97	1605756.37	3695548.28	4313.69	LIPT	NVA
1184	40°45'49.32720"N	102°13'48.26640"W	3653.43	1537761.48	3905616.92	3721.49	LIPT	NVA
1185	40°31'38.73673"N	102°26'12.05700"W	3796.50	1449689.65	3851392.62	3865.30	LIPT	NVA
1186	40°20'55.89920"N	102°29'23.59824"W	3809.43	1384169.10	3838818.53	3879.28	LIPT	NVA
1187	40°15'47.67412"N	102°43'08.48712"W	4001.20	1350909.59	3775965.76	4070.15	LIPT	NVA
1188	40°49'06.11890"N	103°16'14.80512"W	4122.93	1548733.72	3616964.41	4186.89	LIPT	NVA
1189	40°42'19.55185"N	102°33'21.39408"W	3903.67	1513381.08	3816106.18	3970.63	LIPT	NVA
1190	40°18'31.26798"N	103°05'59.94852"W	4365.69	1364352.40	3669247.46	4432.07	LIPT	NVA
1191	40°53'16.46833"N	102°41'23.55288"W	3592.28	1578626.22	3776885.55	3658.00	LIPT	NVA
1192	40°50'14.63946"N	102°31'03.27252"W	3907.62	1561790.04	3825120.92	3973.95	LIPT	NVA
1193	40°51'05.68127"N	103°29'49.35336"W	4228.09	1559336.70	3554081.18	4290.90	LIPT	NVA
1194	40°28'56.94323"N	102°49'01.92864"W	4173.91	1429897.63	3746163.96	4240.84	LIPT	NVA
1195	40°26'14.83159"N	103°02'44.18160"W	4419.77	1411658.89	3683109.27	4485.75	LIPT	NVA
1196	40°35'10.26107"N	102°05'27.83976"W	3543.86	1474585.02	3946582.56	3614.11	LIPT	NVA
1197	40°37'49.38107"N	103°08'36.82896"W	3970.34	1481180.75	3653984.61	4035.45	LIPT	NVA
1198	40°33'18.65952"N	103°00'33.29280"W	4385.45	1454813.77	3692021.27	4451.23	LIPT	NVA
1199	40°36'11.44310"N	102°25'02.48412"W	3780.88	1477456.36	3855802.53	3849.21	LIPT	NVA
1200	40°37'25.18518"N	102°31'57.10692"W	3881.76	1483824.03	3823590.71	3949.38	LIPT	NVA
1201	40°31'38.21416"N	102°14'35.26656"W	3636.82	1451553.84	3905165.54	3706.58	LIPT	NVA
1202	40°32'25.35972"N	102°52'32.19240"W	4226.78	1450493.24	3729300.07	4293.17	LIPT	NVA
1203	40°39'28.59826"N	102°44'27.76992"W	4089.14	1494438.72	3765349.70	4155.58	LIPT	NVA
1204	40°18'24.17004"N	102°47'36.24864"W	4099.98	1366096.07	3754735.53	4168.19	LIPT	NVA
1205	40°21'06.61248"N	102°08'30.31656"W	3568.43	1388735.95	3935746.88	3640.01	LIPT	NVA

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			US FT	US FT	US FT	US FT		
1206	40°17'44.02558"N	102°37'24.96072"W	3911.08	1363526.48	3802200.55	3980.48	LIPT	NVA
1207	40°30'40.58521"N	102°37'30.61164"W	3989.47	1442053.95	3799215.72	4057.35	LIPT	NVA
1208	40°43'18.35530"N	102°48'24.15132"W	4152.67	1517119.73	3746434.37	4218.66	LIPT	NVA
1209	40°48'03.53707"N	102°57'35.38728"W	3721.76	1544717.02	3703182.81	3787.30	LIPT	NVA
1210	40°26'10.26931"N	103°13'35.23080"W	4115.96	1409855.52	3632799.06	4181.45	LIPT	NVA
1211	40°36'49.54176"N	102°47'59.51472"W	4132.08	1477847.47	3749528.39	4198.51	LIPT	NVA
1212	40°17'38.53835"N	102°51'04.17996"W	4161.80	1360994.24	3738772.25	4229.72	LIPT	NVA
1213	40°25'43.78865"N	103°22'54.65388"W	4024.00	1406105.55	3589620.23	4088.91	LIPT	NVA
1214	40°59'44.03296"N	102°49'37.74036"W	4158.61	1616660.56	3737764.39	4223.54	LIPT	NVA
1215	40°30'17.19860"N	103°08'31.63056"W	4249.47	1435447.73	3655601.89	4314.98	LIPT	NVA
1216	40°45'49.10220"N	102°41'24.10548"W	4051.97	1533371.54	3778277.62	4118.08	LIPT	NVA
1217	40°51'01.86228"N	102°49'28.30584"W	3654.93	1563857.84	3740081.83	3720.62	LIPT	NVA
1218	40°51'07.56418"N	102°21'47.06856"W	3796.18	1568617.87	3867658.54	3863.12	LIPT	NVA
1219	40°26'19.10191"N	102°33'02.20824"W	3880.21	1416288.37	3820815.16	3949.08	LIPT	NVA
1220	40°16'14.35940"N	102°14'45.34908"W	3643.11	1358099.98	3907817.45	3714.61	LIPT	NVA
1221	40°54'20.04559"N	103°13'44.68548"W	4509.10	1580787.76	3627689.31	4572.87	LIPT	NVA
1222	40°59'05.30848"N	102°03'55.56096"W	3574.56	1619984.18	3948072.91	3642.48	LIPT	NVA
1223	40°35'52.64214"N	103°05'12.88104"W	4147.40	1469794.09	3670024.97	4212.80	LIPT	NVA
1224	40°15'51.44202"N	103°12'40.82580"W	4446.83	1347363.87	3638620.45	4512.87	LIPT	NVA
1225	40°53'55.30816"N	102°58'49.14048"W	3976.93	1580142.43	3696501.55	4042.00	LIPT	NVA
1226	40°21'41.67443"N	103°25'35.92740"W	4107.89	1381317.15	3577725.06	4172.82	LIPT	NVA
1227	40°17'33.13475"N	103°20'27.41424"W	4460.15	1356744.23	3602211.90	4525.48	LIPT	NVA
1228	40°40'46.67920"N	102°52'40.64016"W	4207.46	1501184.77	3727148.24	4273.37	LIPT	NVA
1229	40°44'56.27699"N	102°25'10.53624"W	3819.88	1530516.40	3853337.12	3887.19	LIPT	NVA
2107	40°58'05.39252"N	102°14'37.15548"W	3472.71	1612068.04	3899122.48	3539.94	LIPT	VVA
2108	40°16'00.29734"N	102°56'48.10920"W	4291.88	1350275.65	3712420.60	4359.42	LIPT	VVA
2109	40°45'30.85312"N	103°03'42.49224"W	3768.73	1528478.19	3675386.05	3833.95	LIPT	VVA

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			US FT	US FT	US FT	US FT		
2110	40°45'39.27859"N	103°31'01.39512"W	4332.05	1526186.91	3549284.90	4395.01	LIPT	VVA
2111	40°36'36.18443"N	103°31'27.84828"W	4377.18	1471193.35	3548474.18	4440.71	LIPT	VVA
2112	40°55'16.72442"N	102°31'01.89264"W	3513.83	1592349.65	3824198.71	3579.90	LIPT	VVA
2113	40°33'07.33734"N	103°24'38.51100"W	4192.94	1450787.81	3580533.65	4257.20	LIPT	VVA
2114	40°56'06.89338"N	103°20'33.97092"W	4371.44	1590813.93	3596008.25	4434.66	LIPT	VVA
2115	40°22'52.45136"N	102°16'37.14240"W	3663.27	1398040.71	3897694.10	3733.98	LIPT	VVA
2116	40°56'07.45480"N	103°29'48.76656"W	4250.43	1589871.91	3553436.39	4313.12	LIPT	VVA
2117	40°26'20.92769"N	102°05'24.80568"W	3523.51	1421067.04	3948875.73	3594.77	LIPT	VVA
2118	40°15'41.40194"N	102°04'15.66516"W	3517.44	1356606.26	3956719.52	3589.95	LIPT	VVA
2119	40°21'26.10198"N	102°58'12.69660"W	4242.03	1383043.08	3704925.97	4308.76	LIPT	VVA
2120	40°21'50.71327"N	103°13'00.69564"W	4284.28	1383667.42	3636144.72	4349.96	LIPT	VVA
2121	40°39'58.19274"N	103°00'37.00044"W	4120.07	1495222.14	3690600.13	4185.59	LIPT	VVA
2122	40°21'06.07669"N	102°51'07.56720"W	4146.12	1381978.25	3737882.89	4213.63	LIPT	VVA
2123	40°15'54.32094"N	102°30'36.51624"W	3829.86	1353478.28	3834205.04	3899.99	LIPT	VVA
2124	40°34'48.45587"N	103°16'38.07840"W	3949.12	1461919.14	3617351.03	4013.86	LIPT	VVA
2125	40°40'21.43175"N	102°17'58.60536"W	3708.81	1503896.71	3887563.81	3777.19	LIPT	VVA
2126	40°58'46.01694"N	103°06'06.75036"W	4351.58	1608622.55	3662112.68	4415.83	LIPT	VVA
2127	40°48'40.86961"N	103°22'59.17512"W	4112.43	1545417.25	3585944.14	4175.88	LIPT	VVA
2128	40°43'53.47625"N	103°19'44.50980"W	4129.79	1516702.49	3601620.47	4193.67	LIPT	VVA
2129	40°23'41.14388"N	102°42'14.76108"W	4010.60	1398928.13	3778618.16	4078.79	LIPT	VVA
2130	40°51'56.79461"N	102°13'37.57008"W	3679.46	1574956.21	3905067.11	3746.98	LIPT	VVA
2131	40°51'08.42544"N	102°06'46.68192"W	3598.37	1571249.72	3936801.32	3666.56	LIPT	VVA
2132	40°45'51.07223"N	102°13'48.25848"W	3652.98	1537937.98	3905611.02	3721.03	LIPT	VVA
2133	40°31'37.64759"N	102°26'13.25652"W	3794.99	1449576.30	3851303.85	3863.80	LIPT	VVA
2134	40°20'54.53664"N	102°29'23.34156"W	3808.28	1384031.97	3838843.07	3878.13	LIPT	VVA
2135	40°15'48.31348"N	102°43'07.08204"W	3998.77	1350977.67	3776072.60	4067.72	LIPT	VVA
2136	40°53'14.37097"N	102°41'26.15676"W	3591.90	1578407.72	3776692.38	3657.63	LIPT	VVA

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			US FT	US FT	US FT	US FT		
2137	40°28'56.44376"N	102°49'02.48736"W	4172.96	1429845.80	3746122.34	4239.89	LIPT	VVA
2138	40°26'12.02701"N	103°02'43.97136"W	4413.59	1411375.64	3683133.37	4479.57	LIPT	VVA
2139	40°35'08.38298"N	102°05'28.61700"W	3547.89	1474392.80	3946529.94	3618.14	LIPT	VVA
2140	40°37'48.17935"N	103°08'37.99212"W	3965.31	1481056.79	3653898.19	4030.42	LIPT	VVA
2141	40°33'18.91768"N	103°00'36.41004"W	4386.96	1454833.13	3691780.02	4452.73	LIPT	VVA
2142	40°36'08.85571"N	102°25'02.07516"W	3779.51	1477195.77	3855843.15	3847.85	LIPT	VVA
2143	40°37'23.77574"N	102°32'00.39228"W	3883.27	1483673.00	3823342.30	3950.89	LIPT	VVA
2144	40°31'37.22376"N	102°14'36.58416"W	3635.44	1451449.95	3905067.55	3705.21	LIPT	VVA
2145	40°30'41.32350"N	102°37'32.43000"W	3988.12	1442124.07	3799072.93	4056.00	LIPT	VVA
2146	40°43'19.52234"N	102°48'22.40784"W	4152.19	1517241.86	3746564.96	4218.18	LIPT	VVA
2147	40°36'43.57606"N	102°47'59.81928"W	4140.94	1477243.31	3749523.30	4207.38	LIPT	VVA
2148	40°25'43.98269"N	103°22'56.67960"W	4018.66	1406121.44	3589463.16	4083.57	LIPT	VVA
2149	40°59'42.03186"N	102°49'38.25084"W	4159.03	1616456.94	3737731.37	4223.96	LIPT	VVA
2150	40°30'19.10455"N	103°08'32.16984"W	4241.60	1435639.43	3655555.12	4307.11	LIPT	VVA
2151	40°45'47.70054"N	102°41'22.89048"W	4048.25	1533232.72	3778375.56	4114.36	LIPT	VVA
2152	40°51'01.43633"N	102°49'32.30580"W	3652.87	1563805.48	3739775.88	3718.57	LIPT	VVA
2153	40°51'05.31515"N	102°22'56.73612"W	3801.14	1568201.62	3862316.05	3868.00	LIPT	VVA
2154	40°26'17.75512"N	102°33'00.11808"W	3880.19	1416157.53	3820981.22	3949.07	LIPT	VVA
2155	40°16'14.47367"N	102°14'48.82308"W	3644.61	1358101.66	3907547.93	3716.09	LIPT	VVA
2156	40°54'19.48655"N	103°13'41.89152"W	4507.38	1580736.69	3627905.23	4571.16	LIPT	VVA
2157	40°59'02.60077"N	102°03'55.04940"W	3575.63	1619711.85	3948122.73	3643.55	LIPT	VVA
2158	40°15'52.55399"N	103°12'39.72492"W	4449.91	1347478.55	3638702.85	4515.95	LIPT	VVA
2159	40°53'56.92351"N	102°58'49.99260"W	3977.77	1580303.99	3696431.50	4042.84	LIPT	VVA
2160	40°21'43.10701"N	103°25'37.24932"W	4104.86	1381459.68	3577619.38	4169.79	LIPT	VVA
2161	40°44'57.87571"N	102°25'12.41544"W	3819.51	1530673.07	3853186.95	3886.81	LIPT	VVA
3077	40°15'58.47466"N	102°56'48.67548"W	4289.30	1350090.03	3712382.03	4356.83	LIPT	CAL
3078	40°45'30.46172"N	103°03'41.25528"W	3770.54	1528441.21	3675482.29	3835.76	LIPT	CAL

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			US FT	US FT	US FT	US FT		
3079	40°45'37.08194"N	103°30'57.47796"W	4340.93	1525971.40	3549591.23	4403.90	LIPT	CAL
3080	40°36'37.92485"N	103°31'29.46504"W	4378.30	1471366.65	3548345.60	4441.83	LIPT	CAL
3081	40°55'19.13956"N	102°31'03.63072"W	3516.40	1592589.46	3824057.13	3582.47	LIPT	CAL
3082	40°22'56.00860"N	102°16'40.83060"W	3668.05	1398390.07	3897395.80	3738.74	LIPT	CAL
3083	40°56'05.20141"N	103°29'47.50008"W	4248.80	1589646.10	3553538.72	4311.49	LIPT	CAL
3084	40°26'22.85916"N	102°05'22.78392"W	3523.45	1421268.36	3949024.43	3594.71	LIPT	CAL
3085	40°15'42.88320"N	102°04'17.31108"W	3517.34	1356751.11	3956586.23	3589.84	LIPT	CAL
3086	40°21'06.88338"N	102°51'05.44320"W	4144.85	1382064.75	3738044.82	4212.37	LIPT	CAL
3087	40°15'54.89039"N	102°30'34.54740"W	3837.24	1353541.02	3834355.63	3907.38	LIPT	CAL
3088	40°34'49.20859"N	103°16'43.28292"W	3963.64	1461985.23	3616947.68	4028.37	LIPT	CAL
3089	40°40'20.58924"N	102°17'56.62212"W	3710.56	1503817.02	3887719.60	3778.94	LIPT	CAL
3090	40°58'43.33789"N	103°06'07.86564"W	4356.30	1608349.19	3662034.50	4420.55	LIPT	CAL
3091	40°43'53.07485"N	103°19'41.69208"W	4133.93	1516667.20	3601838.33	4197.81	LIPT	CAL
3092	40°51'10.26108"N	102°06'47.05596"W	3600.89	1571434.26	3936765.50	3669.08	LIPT	CAL
3093	40°31'37.97782"N	102°26'10.67532"W	3795.17	1449616.58	3851501.90	3863.98	LIPT	CAL
3094	40°15'47.58638"N	102°43'06.00240"W	4003.65	1350906.76	3776158.56	4072.60	LIPT	CAL
3095	40°53'17.94433"N	102°41'25.62288"W	3594.81	1578770.49	3776721.91	3660.52	LIPT	CAL
3096	40°28'54.67390"N	102°49'01.92144"W	4169.14	1429668.10	3746171.46	4236.07	LIPT	CAL
3097	40°26'13.50406"N	103°02'44.09196"W	4418.72	1411524.80	3683119.91	4484.70	LIPT	CAL
3098	40°35'05.89250"N	102°05'27.72708"W	3547.60	1474143.59	3946608.24	3617.86	LIPT	CAL
3099	40°37'46.28356"N	103°08'37.35852"W	3968.68	1480866.30	3653952.12	4033.79	LIPT	CAL
3100	40°33'18.64998"N	103°00'31.00716"W	4385.19	1454817.76	3692197.65	4450.97	LIPT	CAL
3101	40°37'22.75460"N	102°31'57.41544"W	3884.62	1483577.40	3823575.17	3952.25	LIPT	CAL
3102	40°31'39.79830"N	102°14'38.98284"W	3636.25	1451703.51	3904872.89	3706.01	LIPT	CAL
3103	40°30'40.64854"N	102°37'34.88988"W	3991.69	1442049.64	3798885.25	4059.57	LIPT	CAL
3104	40°45'46.56856"N	102°48'24.73056"W	3994.29	1532111.08	3745934.31	4060.21	LIPT	CAL
3105	40°36'49.65822"N	102°47'57.54012"W	4132.39	1477863.89	3749680.25	4198.82	LIPT	CAL

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PT#	NAD83(2011)		ELLIPSOID	COLORADO NORTH ZONE		NAVD 88	CODE	NOTE
	LATITUDE	LONGITUDE	HEIGHT	NORTHING	EASTING	ELEVATION		
			US FT	US FT	US FT	US FT		
3106	40°59'39.17029"N	102°49'37.66188"W	4164.30	1616168.81	3737785.24	4229.24	LIPT	CAL
3107	40°51'05.64538"N	102°21'45.98568"W	3794.86	1568426.74	3867748.57	3861.81	LIPT	CAL
3108	40°26'21.03216"N	102°33'00.72396"W	3881.82	1416487.41	3820923.37	3950.69	LIPT	CAL
3109	40°16'14.45218"N	102°14'42.66492"W	3641.59	1358116.99	3908025.01	3713.09	LIPT	CAL
3110	40°54'17.56948"N	103°13'44.13936"W	4509.30	1580538.31	3627737.65	4573.07	LIPT	CAL
3111	40°58'09.41599"N	102°03'54.46368"W	3577.36	1614334.72	3948376.08	3645.32	LIPT	CAL
3112	40°15'49.45194"N	103°12'40.47012"W	4444.96	1347163.27	3638653.21	4511.00	LIPT	CAL
3113	40°53'58.15662"N	102°58'49.15740"W	3977.81	1580430.56	3696492.06	4042.88	LIPT	CAL
3114	40°21'59.31882"N	103°25'37.38504"W	4070.87	1383099.51	3577570.53	4135.79	LIPT	CAL
3115	40°44'59.08351"N	102°25'10.53156"W	3822.75	1530800.27	3853327.62	3890.05	LIPT	CAL
2041000	40°33'53.10464"N	103°08'36.14604"W	4158.21	1457279.75	3654672.62	4223.52	LIPT	NVA
2042000	40°26'10.09579"N	103°13'37.21440"W	4112.86	1409834.03	3632646.19	4178.35	LIPT	VVA
2043000	40°26'12.08256"N	103°13'35.85576"W	4114.57	1410037.71	3632746.05	4180.05	LIPT	CAL
2051000	40°26'44.33352"N	102°43'17.87160"W	4061.23	1417303.28	3773156.98	4128.95	LIPT	NVA
2052000	40°32'25.46128"N	102°52'34.24944"W	4225.66	1450498.81	3729141.03	4292.05	LIPT	VVA
2053000	40°32'25.34186"N	102°52'29.59356"W	4224.68	1450497.37	3729500.68	4291.07	LIPT	CAL
2061000	40°59'00.46406"N	102°15'32.38920"W	3396.02	1617482.99	3894684.36	3463.17	LIPT	NVA
2062000	40°48'07.14542"N	102°57'35.45352"W	3719.56	1545081.91	3703167.26	3785.11	LIPT	VVA
2063000	40°48'09.59515"N	102°57'35.92620"W	3721.03	1545328.69	3703123.82	3786.57	LIPT	CAL
2071000	40°40'03.87793"N	103°26'38.85036"W	4383.05	1492712.85	3570269.92	4446.62	LIPT	NVA
2072000	40°40'04.75043"N	103°26'36.20184"W	4384.44	1492805.85	3570471.90	4448.01	LIPT	VVA
2073000	40°40'03.87221"N	103°26'33.89892"W	4387.03	1492721.12	3570651.38	4450.60	LIPT	CAL
2101000	40°55'16.29473"N	103°06'55.41372"W	4186.38	1587303.50	3658952.16	4250.76	LIPT	NVA
2102000	40°49'07.70833"N	103°16'14.90772"W	4124.48	1548894.33	3616952.48	4188.44	LIPT	VVA
2103000	40°56'07.28732"N	103°20'38.76000"W	4369.39	1590844.85	3595639.82	4432.60	LIPT	CAL
2121000	40°41'05.79073"N	102°10'01.78428"W	3620.62	1509735.85	3924110.63	3689.64	LIPT	NVA
2121001	40°34'39.23321"N	102°18'06.49116"W	3672.61	1469267.04	3888205.30	3741.68	LIPT	NVA

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PT#	NAD83(2011)		ELLIPSOID	COLORADO NORTH ZONE		NAVD 88	CODE	NOTE
	LATITUDE	LONGITUDE	HEIGHT	NORTHING	EASTING	ELEVATION		
			US FT	US FT	US FT	US FT		
2122000	40°41'06.83221"N	102°09'58.25880"W	3618.73	1509851.39	3924378.07	3687.76	LIPT	VVA
2123000	40°41'08.27804"N	102°09'56.82096"W	3618.42	1510001.77	3924483.26	3687.44	LIPT	CAL
A 15	40°35'03.98465"N	102°18'07.39620"W	3668.73	1471767.69	3888045.20	3737.75	MFBC	NGS
A 17	40°28'57.44348"N	103°21'04.79916"W	3972.26	1425901.04	3597638.16	4037.09	MFBC	NGS
A 442	40°40'34.13068"N	103°09'59.08752"W	3836.61	1497679.96	3647205.89	3901.54	MFIR	NGS
A 443	40°55'24.63352"N	102°33'44.57268"W	3533.23	1592732.85	3811690.36	3599.14	MFIR	NGS
B 439	40°55'17.18224"N	103°06'56.68956"W	4188.21	1587390.65	3658851.84	4252.59	MFIR	NGS
CUB	40°58'29.48664"N	102°19'10.24824"W	3453.77	1613744.85	3878098.37	3520.62	MFBC	NGS
D 73	39°47'13.73222"N	102°42'24.35508"W	4205.91	1177673.24	3784847.28	4277.22	MFBC	NGS
G 15	40°44'56.23098"N	102°17'12.22692"W	3705.54	1531817.88	3890127.54	3773.42	MFBC	NGS
PAT AZ MK	40°57'26.16376"N	102°25'41.07072"W	3473.68	1606283.03	3848359.80	3539.99	MFBC	NGS
R 57 RESET	39°44'25.11917"N	103°39'01.66248"W	4870.69	1153673.83	3520090.12	4935.29	MFBC	NGS
S 70	39°48'46.75493"N	103°35'34.25676"W	4655.39	1180484.69	3535719.01	4720.40	MFBC	NGS
U 59	40°09'42.04645"N	102°43'05.43216"W	4026.14	1313937.37	3777362.94	4095.50	MFBC	NGS

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PT#	NAD83(2011)		ELLIPSOID	COLORADO SOUTH ZONE		NAVD 88	CODE	NOTE
	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
1001	37°49'27.27239"N	102°06'58.96476"W	3612.51	1439194.66	3977092.00	3691.41	LIPT	NVA
1002	37°19'22.29341"N	102°36'55.36944"W	4349.34	1251883.42	3838681.49	4425.30	LIPT	NVA
1003	37°49'28.82438"N	102°36'41.58576"W	4035.70	1434550.81	3834145.12	4111.49	LIPT	NVA
1004	37°39'30.07008"N	103°23'22.07580"W	4459.09	1367993.18	3610907.53	4530.10	LIPT	NVA
1005	38°18'49.42091"N	103°10'17.01228"W	4207.83	1608069.50	3668069.07	4281.73	LIPT	NVA
1006	37°22'55.82662"N	103°11'21.28128"W	5067.71	1268834.09	3671338.77	5138.37	LIPT	NVA
1007	37°29'53.79227"N	103°09'44.83224"W	4942.24	1311288.84	3678063.02	5013.53	LIPT	NVA
1008	37°35'07.99238"N	103°13'18.78456"W	4516.88	1342632.84	3660052.03	4588.19	LIPT	NVA
1009	37°14'09.14762"N	102°36'55.87488"W	4348.57	1220224.87	3839618.56	4424.75	LIPT	NVA
1010	37°00'56.52641"N	103°53'08.10384"W	6235.93	1131165.56	3471363.31	6299.52	LIPT	NVA
1011	37°08'05.24270"N	103°59'37.14144"W	5575.19	1173994.61	3439114.72	5639.21	LIPT	NVA
1012	37°57'14.74150"N	102°55'25.88916"W	3918.63	1479021.55	3742679.91	3993.08	LIPT	NVA
1013	37°33'24.78517"N	102°42'39.20328"W	4419.40	1336214.34	3808377.29	4494.21	LIPT	NVA
1014	37°48'38.86294"N	102°53'38.98932"W	4194.82	1427099.05	3752693.81	4268.50	LIPT	NVA
1015	37°03'33.04588"N	103°44'27.29724"W	5844.30	1147756.41	3513299.49	5909.47	LIPT	NVA
1016	38°19'56.22712"N	102°43'11.04708"W	3866.90	1618368.04	3797411.54	3942.05	LIPT	NVA
1017	37°01'57.73595"N	102°42'20.81952"W	4326.06	1145482.18	3815565.39	4402.13	LIPT	NVA
1018	37°27'31.13600"N	102°04'25.69836"W	3604.73	1306611.90	3994262.29	3683.64	LIPT	NVA
1019	37°57'16.91251"N	102°30'09.23256"W	3869.15	1482864.43	3864089.46	3945.98	LIPT	NVA
1020	38°22'56.63834"N	102°18'27.47304"W	4049.61	1640386.53	3914940.97	4125.77	LIPT	NVA
1021	37°06'24.05016"N	104°19'48.12384"W	6049.91	1162355.73	3341189.75	6111.74	LIPT	NVA
1022	37°31'14.21328"N	103°19'46.69572"W	5112.46	1318250.51	3629387.18	5182.60	LIPT	NVA
1023	37°19'14.52792"N	103°36'35.93484"W	5561.72	1243707.33	3549574.31	5628.94	LIPT	NVA
1024	37°13'19.49102"N	102°16'37.61868"W	3852.95	1218425.57	3938258.07	3931.66	LIPT	NVA
1025	37°43'58.44659"N	104°06'01.21500"W	5071.37	1391268.90	3404753.73	5138.52	LIPT	NVA
1026	37°13'13.19138"N	103°24'35.16840"W	5679.32	1208410.27	3608600.15	5747.70	LIPT	NVA
1027	37°40'21.80683"N	102°42'40.27068"W	4440.99	1378372.38	3807032.28	4515.61	LIPT	NVA

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PT#	NAD83(2011)		ELLIPSOID	COLORADO SOUTH ZONE		NAVD 88	CODE	NOTE
	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
1028	38°17'45.58873"N	102°28'18.75396"W	3731.48	1607369.87	3868904.82	3807.70	LIPT	NVA
1029	37°33'56.33460"N	103°26'03.34536"W	4485.12	1333956.10	3598689.30	4555.23	LIPT	NVA
1030	37°14'04.23726"N	104°19'45.20532"W	5655.99	1208899.65	3340842.80	5719.44	LIPT	NVA
1031	37°51'57.22330"N	103°11'55.16808"W	4078.81	1444846.34	3664265.64	4151.90	LIPT	NVA
1032	37°10'13.83341"N	103°52'57.68508"W	5725.73	1187539.51	3471232.31	5790.49	LIPT	NVA
1033	37°58'06.56087"N	103°11'58.43364"W	4044.05	1482186.68	3663083.93	4117.68	LIPT	NVA
1034	38°22'02.52808"N	102°32'47.69340"W	3764.38	1632662.48	3846654.05	3840.03	LIPT	NVA
1035	37°30'12.63910"N	104°19'18.90192"W	5556.12	1306865.52	3341734.53	5620.62	LIPT	NVA
1036	37°10'43.55357"N	102°28'14.31084"W	4117.74	1200776.41	3882449.95	4195.25	LIPT	NVA
1037	37°56'26.82024"N	102°07'01.64316"W	3469.76	1481595.62	3975340.73	3548.58	LIPT	NVA
1038	37°22'29.08553"N	104°14'36.95604"W	5548.78	1260280.58	3365082.13	5613.57	LIPT	NVA
1039	37°43'59.71156"N	103°16'11.08884"W	4252.31	1396063.55	3644903.32	4324.50	LIPT	NVA
1040	37°51'59.78887"N	102°24'37.56132"W	3827.15	1451670.63	3891699.82	3904.24	LIPT	NVA
1041	37°59'51.87376"N	102°24'41.08068"W	3675.06	1499386.25	3889839.18	3752.34	LIPT	NVA
1042	37°27'17.59741"N	102°51'22.45500"W	4659.19	1297865.49	3767313.22	4732.91	LIPT	NVA
1043	37°33'00.62384"N	103°30'51.07716"W	4845.05	1327820.21	3575648.73	4914.53	LIPT	NVA
1044	37°22'48.65740"N	102°26'51.15696"W	4083.76	1274295.23	3886779.95	4160.81	LIPT	NVA
1045	37°16'50.17030"N	102°54'17.22528"W	4828.55	1234035.12	3754989.61	4901.77	LIPT	NVA
1046	37°01'22.89587"N	104°07'14.97540"W	5993.79	1132731.78	3402645.36	6055.96	LIPT	NVA
1047	37°03'42.64445"N	102°34'11.20512"W	4238.68	1157304.11	3854916.20	4315.81	LIPT	NVA
1048	38°16'00.21803"N	102°57'31.00392"W	4247.55	1592550.84	3729566.09	4322.07	LIPT	NVA
1049	37°08'55.52059"N	102°54'17.37216"W	4768.19	1186045.97	3756311.34	4841.68	LIPT	NVA
1050	38°23'42.15026"N	103°10'18.70932"W	4234.55	1637669.61	3667195.87	4308.15	LIPT	NVA
1051	38°23'48.42146"N	102°43'49.35684"W	3895.69	1641756.03	3793663.95	3970.57	LIPT	NVA
1052	37°21'58.23094"N	102°59'43.43784"W	5007.56	1264462.38	3727799.47	5079.89	LIPT	NVA
1053	37°20'30.49987"N	103°58'49.13148"W	5036.27	1249424.92	3441775.72	5101.93	LIPT	NVA
1054	37°38'40.84883"N	103°39'54.50832"W	4593.89	1361330.46	3531220.28	4663.23	LIPT	NVA

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PT#	NAD83(2011)		ELLIPSOID	COLORADO SOUTH ZONE		NAVD 88	CODE	NOTE
	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
1055	37°16'46.33655"N	102°43'26.81256"W	4532.11	1235158.62	3807546.01	4607.11	LIPT	NVA
1056	37°17'40.97512"N	102°11'09.90456"W	3727.96	1245783.39	3963810.52	3807.04	LIPT	NVA
1057	37°45'36.98942"N	102°17'30.06024"W	3753.61	1414129.79	3927289.49	3831.33	LIPT	NVA
1058	37°47'32.66394"N	104°20'01.03164"W	5685.43	1412007.90	3337026.55	5749.69	LIPT	NVA
1059	37°24'42.52342"N	102°43'43.71708"W	4469.13	1283259.70	3804751.73	4543.96	LIPT	NVA
1060	37°26'29.89676"N	103°32'22.92072"W	5417.30	1288153.24	3569083.65	5485.62	LIPT	NVA
1061	37°01'05.71764"N	102°18'27.41472"W	3745.68	1143947.95	3931918.50	3824.91	LIPT	NVA
1062	37°22'51.43724"N	104°07'22.66248"W	5361.71	1263035.18	3400100.83	5427.02	LIPT	NVA
1063	37°18'09.24469"N	104°17'35.05668"W	5626.09	1233812.23	3351046.93	5690.23	LIPT	NVA
1064	37°25'36.56154"N	102°37'00.15420"W	4291.47	1289707.98	3837126.92	4367.21	LIPT	NVA
1065	37°33'24.22782"N	102°29'55.63932"W	4107.98	1338063.30	3869832.68	4184.35	LIPT	NVA
1066	37°05'12.71695"N	102°57'18.73692"W	4701.91	1163115.36	3742246.88	4775.12	LIPT	NVA
1067	37°11'58.18902"N	103°59'43.19664"W	5433.21	1197544.49	3438244.94	5497.74	LIPT	NVA
1068	37°21'49.20916"N	103°31'12.76032"W	5537.38	1259889.39	3575342.21	5605.35	LIPT	NVA
1069	37°08'58.51378"N	102°16'38.46432"W	3886.27	1192042.97	3939100.19	3965.24	LIPT	NVA
1070	37°02'40.84228"N	104°03'16.68924"W	5722.60	1140906.77	3421846.01	5785.47	LIPT	NVA
1071	38°21'19.08486"N	102°05'10.35420"W	3771.81	1632768.49	3978734.30	3849.02	LIPT	NVA
1072	37°09'47.93177"N	102°21'43.45200"W	3963.76	1196197.89	3914254.13	4042.08	LIPT	NVA
1073	37°08'57.23995"N	102°03'31.70448"W	335.62	1194185.82	4002762.25	254.88	LIPT	NVA
1074	37°13'55.81967"N	103°51'05.39676"W	5586.78	1210147.18	3479923.28	5652.12	LIPT	NVA
1075	37°36'52.84451"N	102°37'12.95796"W	4324.91	1358045.31	3833986.22	4400.31	LIPT	NVA
1076	37°36'01.16388"N	103°19'49.93608"W	4572.99	1347259.92	3628452.20	4643.75	LIPT	NVA
1077	37°36'05.79960"N	104°01'48.21636"W	5075.62	1343781.09	3425827.14	5142.78	LIPT	NVA
1078	37°06'18.59900"N	102°51'01.95300"W	4583.46	1170624.95	3772576.97	4657.75	LIPT	NVA
1079	37°43'52.05526"N	102°04'25.92948"W	3564.77	1405758.87	3990605.47	3643.71	LIPT	NVA
1080	37°39'08.07685"N	102°52'29.70624"W	4635.40	1369544.84	3759873.58	4708.87	LIPT	NVA
1081	38°18'37.23768"N	102°57'01.01448"W	4260.40	1608493.96	3731523.43	4334.86	LIPT	NVA

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PT#	NAD83(2011)		ELLIPSOID	COLORADO SOUTH ZONE		NAVD 88	CODE	NOTE
	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
1082	37°41'02.65949"N	103°06'20.46492"W	4260.50	1379335.75	3692792.73	4333.04	LIPT	NVA
1083	37°44'59.11580"N	102°44'52.05372"W	4296.87	1406094.59	3795615.84	4371.24	LIPT	NVA
1084	37°35'10.41216"N	102°59'36.52548"W	4585.17	1344572.33	3726207.54	4657.98	LIPT	NVA
1085	37°17'40.96921"N	102°20'36.72528"W	3946.31	1244196.80	3918036.00	4024.31	LIPT	NVA
1086	37°29'59.05201"N	104°09'50.41260"W	5558.45	1306107.85	3387558.35	5623.87	LIPT	NVA
1087	38°00'46.03223"N	102°36'47.50812"W	3722.20	1503002.35	3831553.59	3798.54	LIPT	NVA
1088	37°46'28.62728"N	102°25'11.36028"W	4010.13	1418103.28	3890095.42	4087.00	LIPT	NVA
1089	37°09'34.06604"N	103°46'41.36808"W	5628.52	1184062.40	3501760.53	5693.86	LIPT	NVA
1090	37°12'24.26864"N	102°56'27.66228"W	4836.45	1206860.41	3745188.32	4909.40	LIPT	NVA
1091	37°27'16.99884"N	102°57'56.63196"W	4848.48	1296924.16	3735543.92	4921.25	LIPT	NVA
1092	37°52'01.34728"N	102°58'44.25960"W	4117.04	1446900.20	3727653.54	4190.67	LIPT	NVA
1093	37°33'24.67926"N	102°23'30.87852"W	4018.62	1339121.89	3900796.08	4095.63	LIPT	NVA
1094	37°10'12.85655"N	104°07'12.84888"W	5423.59	1186330.36	3402026.08	5487.46	LIPT	NVA
1095	37°08'29.72364"N	104°04'13.39356"W	5498.24	1176118.85	3416709.17	5562.00	LIPT	NVA
1096	37°43'23.93828"N	102°36'08.21880"W	4323.87	1397744.53	3837965.63	4399.37	LIPT	NVA
1097	37°16'44.01196"N	103°21'21.41352"W	5585.71	1230082.78	3623778.73	5654.62	LIPT	NVA
1098	37°56'26.41376"N	102°18'02.64816"W	3626.91	1479689.35	3922424.84	3704.68	LIPT	NVA
1099	37°12'17.42843"N	104°13'32.75940"W	5434.75	1198491.90	3371107.39	5498.51	LIPT	NVA
1100	37°08'55.68972"N	102°43'26.23332"W	4485.86	1187578.54	3809007.29	4561.30	LIPT	NVA
1101	37°31'01.29871"N	102°37'13.32048"W	4301.73	1322504.58	3835053.03	4377.27	LIPT	NVA
1102	37°33'29.40462"N	104°01'23.83680"W	5250.15	1327995.59	3428038.85	5317.03	LIPT	NVA
1103	37°39'07.15946"N	104°19'34.54068"W	5404.25	1360908.95	3339795.16	5468.98	LIPT	NVA
1104	37°50'17.21724"N	102°44'25.46628"W	4104.45	1438318.48	3796799.81	4179.39	LIPT	NVA
1105	37°28'09.90649"N	103°04'30.28332"W	4890.65	1301431.14	3703675.35	4962.51	LIPT	NVA
1106	37°07'07.25452"N	104°07'15.74220"W	5572.88	1167556.62	3402069.03	5636.17	LIPT	NVA
1107	37°33'36.84978"N	103°59'16.51812"W	5427.62	1328912.53	3438277.03	5494.71	LIPT	NVA
1108	37°11'25.73020"N	103°51'03.39372"W	5670.40	1194971.95	3480353.22	5735.46	LIPT	NVA

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	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
1109	37°46'29.35600"N	102°07'44.16816"W	3672.13	1421079.60	3974116.93	3750.88	LIPT	NVA
1110	37°28'15.03106"N	102°18'06.23700"W	3863.78	1308703.58	3927993.85	3941.39	LIPT	NVA
1111	37°01'05.88720"N	102°05'26.10132"W	3561.91	1146203.90	3995246.30	3642.85	LIPT	NVA
1112	37°22'50.60802"N	102°18'48.93264"W	3917.33	1275791.95	3925673.08	3995.18	LIPT	NVA
1113	37°11'34.47568"N	102°11'09.64032"W	3764.44	1208738.76	3965146.70	3843.96	LIPT	NVA
1114	38°23'50.12873"N	102°55'55.37640"W	4162.32	1640277.53	3735883.13	4236.58	LIPT	NVA
1115	37°33'27.68015"N	102°07'42.74328"W	3687.36	1342072.58	3977084.24	3765.69	LIPT	NVA
1116	37°52'58.45440"N	103°20'46.13604"W	4055.21	1450022.86	3621558.42	4127.80	LIPT	NVA
1117	37°13'15.42184"N	102°43'26.47416"W	4473.33	1213836.38	3808207.22	4548.50	LIPT	NVA
1118	37°24'38.37859"N	103°20'55.98888"W	5284.31	1278096.02	3624728.28	5353.74	LIPT	NVA
1119	37°37'23.67329"N	104°11'41.68392"W	5485.38	1350947.44	3377964.37	5551.29	LIPT	NVA
1120	37°20'12.92125"N	104°08'17.50884"W	5361.61	1246939.25	3395908.29	5426.71	LIPT	NVA
1121	37°53'46.61812"N	102°36'45.36144"W	3809.53	1460604.29	3833036.45	3885.63	LIPT	NVA
1122	37°16'44.16848"N	104°12'42.84972"W	5484.68	1225523.51	3374772.81	5549.12	LIPT	NVA
1123	37°16'19.63600"N	103°51'56.77848"W	5374.38	1224617.90	3475514.06	5439.97	LIPT	NVA
1124	37°43'52.80960"N	102°54'10.75932"W	4267.00	1398105.97	3750949.68	4340.42	LIPT	NVA
1125	37°56'23.62146"N	102°43'21.13968"W	3936.82	1475516.22	3800855.80	4012.32	LIPT	NVA
1126	37°25'19.60835"N	102°10'57.67500"W	3753.90	1292176.64	3963151.08	3832.32	LIPT	NVA
1127	37°16'46.50859"N	103°05'02.09904"W	5153.03	1232267.01	3702898.99	5224.46	LIPT	NVA
1128	37°35'20.76475"N	103°30'10.14264"W	4775.28	1342061.65	3578641.34	4845.13	LIPT	NVA
1129	37°22'19.25357"N	104°05'00.69000"W	5442.38	1259951.75	3411607.75	5507.72	LIPT	NVA
1130	37°13'09.87024"N	103°36'41.60376"W	5709.49	1206823.16	3549862.08	5776.19	LIPT	NVA
1131	37°29'20.02520"N	103°33'11.04048"W	5475.83	1305275.68	3564845.21	5544.44	LIPT	NVA
1132	37°47'23.78008"N	103°10'21.98244"W	4082.75	1417381.98	3672424.60	4155.40	LIPT	NVA
1133	37°08'58.03688"N	102°09'20.72196"W	3732.11	1193240.27	3974520.63	3812.06	LIPT	NVA
1134	37°18'20.90239"N	103°30'37.72980"W	5587.28	1238885.55	3578618.30	5655.16	LIPT	NVA
1135	37°32'34.17785"N	102°54'41.28480"W	4529.75	1329424.27	3750400.31	4603.12	LIPT	NVA

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	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
1136	37°00'20.86344"N	102°50'38.65992"W	4206.37	1134510.58	3775491.83	4281.14	LIPT	NVA
1137	37°28'13.25644"N	102°28'23.66904"W	4120.39	1306865.98	3878253.38	4197.05	LIPT	NVA
1138	37°39'32.29049"N	102°17'33.04572"W	3905.57	1377255.63	3928316.28	3983.14	LIPT	NVA
1139	37°19'19.04837"N	104°01'55.79328"W	5171.69	1241957.98	3426817.49	5236.98	LIPT	NVA
1140	37°43'52.19191"N	103°10'03.59724"W	4227.59	1396024.10	3674434.21	4300.04	LIPT	NVA
1141	37°50'19.29721"N	102°13'35.19552"W	3688.98	1443321.03	3945137.52	3767.19	LIPT	NVA
1142	37°04'34.43027"N	102°38'00.37680"W	4295.06	1161963.13	3836188.40	4371.62	LIPT	NVA
1143	37°22'11.51868"N	102°51'34.04016"W	4756.72	1266893.74	3767254.46	4830.33	LIPT	NVA
1144	37°35'17.02000"N	103°59'41.53056"W	5345.79	1339010.30	3436100.10	5413.03	LIPT	NVA
1145	38°16'05.31606"N	102°18'19.57860"W	3755.22	1598823.13	3916991.95	3831.91	LIPT	NVA
1146	38°06'54.65624"N	102°03'49.72968"W	3454.24	1545620.15	3988368.21	3532.72	LIPT	NVA
1147	38°12'31.53586"N	103°22'27.94584"W	4081.47	1568464.62	3610698.76	4154.89	LIPT	NVA
1148	38°15'32.19044"N	102°43'25.92048"W	3905.89	1591634.99	3797020.61	3981.31	LIPT	NVA
1149	38°12'07.44836"N	103°08'34.93680"W	4175.32	1567623.93	3677228.00	4249.49	LIPT	NVA
1150	38°14'51.16772"N	102°04'57.09252"W	3676.76	1593592.10	3981225.32	3754.47	LIPT	NVA
1151	38°10'19.47245"N	103°14'04.25508"W	4094.58	1556054.44	3651213.88	4168.53	LIPT	NVA
2001	37°19'21.85633"N	102°36'54.83484"W	4353.77	1251840.56	3838726.02	4429.73	LIPT	VVA
2002	37°49'28.67614"N	102°36'41.03100"W	4037.74	1434537.20	3834190.07	4113.53	LIPT	VVA
2003	37°39'30.87256"N	103°23'21.88896"W	4456.12	1368074.66	3610920.72	4527.13	LIPT	VVA
2004	38°19'19.97162"N	103°10'17.71536"W	4214.21	1611157.64	3667936.02	4288.09	LIPT	VVA
2005	37°22'54.60899"N	103°11'20.92488"W	5068.60	1268711.68	3671370.58	5139.26	LIPT	VVA
2006	37°29'52.83733"N	103°09'46.21932"W	4937.82	1311189.49	3677953.69	5009.10	LIPT	VVA
2007	37°35'08.65223"N	103°13'08.06304"W	4509.18	1342720.62	3660913.12	4580.51	LIPT	VVA
2008	37°14'09.34206"N	102°36'56.38968"W	4345.76	1220243.24	3839576.34	4421.93	LIPT	VVA
2009	37°00'55.93482"N	103°53'10.81032"W	6242.46	1131101.94	3471144.86	6306.05	LIPT	VVA
2010	37°08'05.37594"N	103°59'39.92604"W	5572.38	1174004.45	3438889.04	5636.41	LIPT	VVA
2011	37°57'15.48943"N	102°55'39.12240"W	3932.54	1479067.96	3741618.36	4006.98	LIPT	VVA

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	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
2012	37°03'35.39599"N	103°44'24.26208"W	5843.99	1147998.69	3513540.99	5909.17	LIPT	VVA
2013	37°01'31.29244"N	102°42'20.41848"W	4296.74	1142809.76	3815677.89	4372.83	LIPT	VVA
2014	37°27'32.71126"N	102°04'21.64764"W	3601.39	1306783.10	3994582.83	3680.30	LIPT	VVA
2015	37°57'17.92717"N	102°29'48.28488"W	3842.03	1483020.89	3865763.00	3918.89	LIPT	VVA
2016	37°06'24.73751"N	104°19'45.33276"W	6041.24	1162428.08	3341414.97	6103.08	LIPT	VVA
2017	37°30'59.69750"N	103°19'50.18304"W	5123.17	1316776.21	3629140.41	5193.29	LIPT	VVA
2018	37°40'20.87688"N	102°43'37.62516"W	4411.00	1378141.12	3802426.05	4485.51	LIPT	VVA
2019	38°17'41.39419"N	102°30'35.60076"W	3660.00	1606594.40	3858014.52	3736.13	LIPT	VVA
2020	37°33'54.90778"N	103°26'05.12664"W	4499.84	1333808.64	3598549.11	4569.94	LIPT	VVA
2021	37°14'01.24890"N	104°19'45.54192"W	5655.91	1208597.08	3340819.37	5719.36	LIPT	VVA
2022	37°51'58.24170"N	103°11'54.72708"W	4076.86	1444950.19	3664298.46	4149.95	LIPT	VVA
2023	37°58'07.26406"N	103°11'58.64640"W	4044.68	1482257.37	3663065.15	4118.31	LIPT	VVA
2024	38°22'53.90929"N	102°32'14.63964"W	3747.20	1637941.00	3849120.43	3822.83	LIPT	VVA
2025	37°30'13.46321"N	104°19'20.02908"W	5558.17	1306947.72	3341642.66	5622.67	LIPT	VVA
2026	37°10'43.77871"N	102°28'13.48788"W	4116.51	1200801.33	3882515.78	4194.03	LIPT	VVA
2027	37°56'27.21509"N	102°07'02.12628"W	3470.66	1481634.13	3975300.61	3549.49	LIPT	VVA
2028	37°22'28.78090"N	104°14'36.89556"W	5548.17	1260249.84	3365087.43	5612.96	LIPT	VVA
2029	37°43'59.94793"N	103°16'11.70912"W	4253.73	1396086.27	3644852.94	4325.91	LIPT	VVA
2030	37°51'41.45278"N	102°24'37.14660"W	3857.88	1449818.09	3891794.39	3934.96	LIPT	VVA
2031	37°59'50.91277"N	102°24'40.65912"W	3675.11	1499290.22	3889876.12	3752.39	LIPT	VVA
2032	37°22'35.58846"N	102°26'50.88552"W	4079.26	1272974.82	3886845.03	4156.32	LIPT	VVA
2033	37°16'45.42416"N	102°52'39.37836"W	4790.30	1233776.11	3762908.02	4863.81	LIPT	VVA
2034	37°01'21.71694"N	104°07'16.26672"W	6000.26	1132611.01	3402542.41	6062.43	LIPT	VVA
2035	37°03'42.71209"N	102°34'06.55680"W	4235.61	1157322.76	3855292.58	4312.74	LIPT	VVA
2036	37°08'59.99809"N	102°54'17.77896"W	4772.51	1186497.75	3756265.83	4846.00	LIPT	VVA
2037	38°24'27.62230"N	103°10'18.72552"W	4263.84	1642268.20	3667079.94	4337.38	LIPT	VVA
2038	38°23'22.30357"N	102°43'49.24596"W	3883.87	1639115.32	3793751.11	3958.78	LIPT	VVA

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	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
2039	37°20'29.76126"N	103°58'31.02924"W	4993.19	1249374.04	3443238.58	5058.88	LIPT	VVA
2040	37°38'39.62209"N	103°39'56.75616"W	4597.28	1361202.86	3531041.97	4666.61	LIPT	VVA
2041	37°16'46.80354"N	102°43'27.41196"W	4533.12	1235204.39	3807496.18	4608.12	LIPT	VVA
2042	37°17'40.25551"N	102°11'17.70720"W	3733.97	1245688.30	3963183.00	3813.03	LIPT	VVA
2043	37°45'38.11507"N	102°17'30.46488"W	3755.62	1414242.46	3927253.11	3833.34	LIPT	VVA
2044	37°47'37.83134"N	104°19'45.60528"W	5658.89	1412546.01	3338258.12	5723.21	LIPT	VVA
2045	37°24'42.08738"N	102°43'11.96148"W	4454.51	1283291.74	3807313.90	4529.41	LIPT	VVA
2046	37°26'30.15805"N	103°32'25.67076"W	5422.84	1288175.01	3568861.37	5491.15	LIPT	VVA
2047	37°00'55.68163"N	102°18'27.67104"W	3733.87	1142932.75	3931932.40	3813.10	LIPT	VVA
2048	37°22'51.76931"N	104°07'22.42560"W	5361.24	1263069.05	3400119.45	5426.56	LIPT	VVA
2049	37°33'24.40184"N	102°28'24.39516"W	4091.59	1338317.90	3877175.39	4168.12	LIPT	VVA
2050	37°12'00.53186"N	103°59'42.46800"W	5425.06	1197782.37	3438300.07	5489.60	LIPT	VVA
2051	37°08'58.28762"N	102°16'37.87176"W	3885.23	1192021.76	3939148.92	3964.20	LIPT	VVA
2052	38°22'11.04809"N	102°05'11.70312"W	3816.77	1638017.70	3978434.87	3893.91	LIPT	VVA
2053	37°13'57.40090"N	103°51'03.87036"W	5583.39	1210309.26	3480043.88	5648.74	LIPT	VVA
2054	37°36'52.54308"N	102°37'12.06588"W	4323.20	1358017.05	3834058.90	4398.60	LIPT	VVA
2055	37°36'05.66201"N	104°01'47.82504"W	5072.94	1343767.67	3425858.84	5140.10	LIPT	VVA
2056	38°18'37.66324"N	102°54'27.54144"W	4143.86	1608873.64	3743750.23	4218.44	LIPT	VVA
2057	37°41'12.12310"N	103°06'30.31848"W	4257.81	1380272.34	3691976.42	4330.35	LIPT	VVA
2058	37°45'07.69385"N	102°44'51.81288"W	4277.75	1406962.42	3795609.61	4352.14	LIPT	VVA
2059	37°17'40.66206"N	102°20'26.53440"W	3941.77	1244193.58	3918860.06	4019.79	LIPT	VVA
2060	37°29'59.16959"N	104°09'50.99832"W	5557.91	1306119.07	3387510.99	5623.32	LIPT	VVA
2061	38°00'45.52553"N	102°37'00.05772"W	3723.66	1502920.10	3830551.34	3799.98	LIPT	VVA
2062	37°46'29.13960"N	102°25'58.24056"W	4050.72	1418031.25	3886331.95	4127.50	LIPT	VVA
2063	37°09'34.29443"N	103°46'39.32544"W	5626.37	1184088.54	3501925.43	5691.72	LIPT	VVA
2064	37°27'17.39797"N	102°57'28.78452"W	4867.47	1297025.52	3737787.38	4940.30	LIPT	VVA
2065	37°52'09.48652"N	102°58'44.22000"W	4105.34	1447723.25	3727634.50	4178.99	LIPT	VVA

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	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
2066	37°33'26.54917"N	102°23'48.76224"W	4022.84	1339263.05	3899350.57	4099.82	LIPT	VVA
2067	37°43'13.07838"N	102°36'10.08108"W	4322.68	1396641.98	3837850.15	4398.17	LIPT	VVA
2068	37°16'44.18054"N	103°21'20.85480"W	5583.03	1230100.86	3623823.49	5651.94	LIPT	VVA
2069	37°56'15.39470"N	102°18'01.71252"W	3637.67	1478578.00	3922537.92	3715.45	LIPT	VVA
2070	37°12'18.40817"N	104°13'35.29632"W	5441.24	1198588.19	3370900.82	5505.00	LIPT	VVA
2071	37°08'55.84056"N	102°44'31.39728"W	4524.33	1187437.54	3803733.28	4599.59	LIPT	VVA
2072	37°31'04.83528"N	102°37'13.47816"W	4294.08	1322861.72	3835029.30	4369.62	LIPT	VVA
2073	37°33'29.86506"N	104°01'22.23768"W	5246.07	1328044.19	3428166.85	5312.96	LIPT	VVA
2074	37°39'07.09826"N	104°19'35.18184"W	5406.75	1360902.11	3339743.68	5471.49	LIPT	VVA
2075	37°49'51.19759"N	102°44'26.10456"W	4063.08	1435686.29	3796826.37	4137.96	LIPT	VVA
2076	37°07'07.01436"N	104°07'18.46272"W	5574.24	1167529.09	3401849.06	5637.53	LIPT	VVA
2077	37°11'23.87231"N	103°51'05.24988"W	5672.03	1194781.42	3480206.37	5737.08	LIPT	VVA
2078	37°46'37.79047"N	102°07'44.42520"W	3667.41	1421931.41	3974065.52	3746.16	LIPT	VVA
2079	37°28'14.90268"N	102°18'33.74568"W	3884.72	1308614.78	3925777.99	3962.29	LIPT	VVA
2080	37°01'05.59744"N	102°03'48.69504"W	3525.34	1146464.04	4003142.15	3606.47	LIPT	VVA
2081	37°22'50.95236"N	102°19'01.22808"W	3922.99	1275792.93	3924680.08	4000.82	LIPT	VVA
2082	38°23'49.75444"N	102°57'07.66476"W	4258.89	1640082.11	3730131.35	4333.10	LIPT	VVA
2083	37°33'27.79175"N	102°08'48.41556"W	3702.16	1341893.56	3971799.30	3780.38	LIPT	VVA
2084	37°52'58.86610"N	103°20'45.48696"W	4054.40	1450065.69	3621609.48	4127.00	LIPT	VVA
2085	37°24'38.86913"N	103°20'43.38276"W	5289.37	1278169.06	3625743.92	5358.82	LIPT	VVA
2086	37°37'22.83787"N	104°11'41.66844"W	5487.77	1350862.97	3377966.79	5553.68	LIPT	VVA
2087	37°16'45.94246"N	104°12'40.79664"W	5478.35	1225705.21	3374936.26	5542.79	LIPT	VVA
2088	37°16'20.27453"N	103°51'59.42376"W	5372.07	1224678.73	3475299.15	5437.66	LIPT	VVA
2089	37°43'52.88358"N	102°53'36.63528"W	4329.98	1398189.79	3753689.67	4403.45	LIPT	VVA
2090	37°56'23.72975"N	102°42'48.27168"W	3941.51	1475605.58	3803487.25	4017.08	LIPT	VVA
2091	37°16'44.54170"N	103°02'59.68932"W	5091.73	1232325.81	3712794.19	5163.49	LIPT	VVA
2092	37°13'10.33496"N	103°36'41.81472"W	5707.88	1206869.81	3549844.06	5774.58	LIPT	VVA

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	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
2093	37°47'35.07900"N	103°10'22.41912"W	4074.88	1418523.60	3672361.09	4147.54	LIPT	VVA
2094	37°08'57.75533"N	102°09'14.31108"W	3732.27	1193230.40	3975040.36	3812.24	LIPT	VVA
2095	37°18'22.59083"N	103°30'40.79376"W	5583.16	1239051.01	3578367.18	5651.04	LIPT	VVA
2096	37°32'26.30677"N	102°54'24.30972"W	4523.46	1328666.38	3751789.00	4596.86	LIPT	VVA
2097	37°39'42.39893"N	102°17'32.91864"W	3905.30	1378277.79	3928291.39	3982.88	LIPT	VVA
2098	37°19'17.24455"N	104°01'54.80724"W	5170.29	1241776.81	3426900.00	5235.58	LIPT	VVA
2099	37°50'29.26784"N	102°13'36.11820"W	3678.66	1444326.32	3945028.22	3756.88	LIPT	VVA
2100	37°22'00.87791"N	102°51'35.33400"W	4748.87	1265814.98	3767180.47	4822.49	LIPT	VVA
2101	37°35'15.06426"N	103°59'39.91344"W	5348.11	1338814.61	3436233.43	5415.35	LIPT	VVA
2102	38°15'22.11844"N	102°18'40.34664"W	3723.06	1594399.33	3915485.78	3799.79	LIPT	VVA
2103	38°07'21.09824"N	102°03'49.51728"W	3483.46	1548293.67	3988286.80	3561.92	LIPT	VVA
2104	38°12'30.80354"N	103°22'28.22016"W	4081.05	1568390.07	3610678.56	4154.46	LIPT	VVA
2105	38°15'08.17668"N	102°43'25.67568"W	3880.51	1589207.47	3797112.32	3955.96	LIPT	VVA
2106	38°13'33.17524"N	103°08'35.04408"W	4217.77	1576292.75	3677000.66	4291.91	LIPT	VVA
3001	37°19'37.92767"N	102°36'56.13552"W	4319.49	1253462.04	3838570.82	4395.43	LIPT	CAL
3002	37°39'30.42864"N	103°23'22.08516"W	4459.97	1368029.42	3610905.96	4530.97	LIPT	CAL
3003	37°22'47.13492"N	103°11'24.97200"W	5072.02	1267947.89	3671062.72	5142.67	LIPT	CAL
3004	37°29'52.92776"N	103°10'32.65572"W	4911.82	1311105.27	3674212.56	4983.01	LIPT	CAL
3005	37°57'15.47719"N	102°56'32.85348"W	3970.83	1478948.57	3737316.65	4045.20	LIPT	CAL
3006	37°03'36.62464"N	103°44'27.37968"W	5842.37	1148118.18	3513285.99	5907.54	LIPT	CAL
3007	37°01'06.09287"N	102°42'20.80764"W	4258.02	1140261.18	3815722.57	4334.14	LIPT	CAL
3008	37°27'19.62220"N	102°04'59.35116"W	338.35	1305348.77	3991593.36	259.48	LIPT	CAL
3009	37°06'23.29132"N	104°19'44.71032"W	6045.68	1162282.45	3341467.22	6107.52	LIPT	CAL
3010	37°30'39.39401"N	103°19'51.56328"W	5111.58	1314720.61	3629076.92	5181.66	LIPT	CAL
3011	37°40'21.44608"N	102°43'05.48436"W	4444.64	1378275.48	3805007.19	4519.21	LIPT	CAL
3012	38°17'43.59826"N	102°32'49.41456"W	3716.02	1606477.94	3847344.94	3792.01	LIPT	CAL
3013	37°58'07.17031"N	103°12'00.29304"W	4042.70	1482244.64	3662933.57	4116.33	LIPT	CAL

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	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
3014	38°23'46.96559"N	102°32'15.34236"W	3762.12	1643303.80	3848894.31	3837.67	LIPT	CAL
3015	37°30'09.56725"N	104°19'02.40024"W	5545.26	1306571.65	3343068.04	5609.80	LIPT	CAL
3016	37°10'40.70352"N	102°27'34.36308"W	4124.74	1200593.32	3885690.63	4202.33	LIPT	CAL
3017	37°56'26.90646"N	102°06'35.56152"W	3472.76	1481680.06	3977428.33	3551.61	LIPT	CAL
3018	37°22'52.72921"N	104°14'24.80532"W	5540.25	1262684.96	3366030.58	5605.08	LIPT	CAL
3019	37°51'10.45008"N	102°24'37.54980"W	3922.35	1446682.88	3891865.77	3999.39	LIPT	CAL
3020	37°59'32.05612"N	102°24'41.48460"W	3687.67	1497381.71	3889873.13	3764.94	LIPT	CAL
3021	37°22'35.33387"N	102°26'51.23292"W	4079.01	1272948.17	3886817.85	4156.07	LIPT	CAL
3022	37°16'45.97709"N	102°51'02.89980"W	4736.20	1234052.00	3770700.91	4809.98	LIPT	CAL
3023	37°01'21.88117"N	104°07'17.56920"W	6004.51	1132626.06	3402436.54	6066.67	LIPT	CAL
3024	37°03'42.34306"N	102°34'32.95848"W	4229.59	1157218.39	3853154.75	4306.67	LIPT	CAL
3025	37°08'55.52927"N	102°53'44.41632"W	4757.49	1186121.10	3758978.49	4831.09	LIPT	CAL
3026	38°25'00.08080"N	103°10'19.74828"W	4289.68	1645548.73	3666916.73	4363.18	LIPT	CAL
3027	38°24'17.38552"N	102°43'49.02132"W	3928.89	1644685.60	3793603.79	4003.74	LIPT	CAL
3028	37°38'38.87938"N	103°39'54.71136"W	4597.26	1361130.98	3531207.87	4666.59	LIPT	CAL
3029	37°17'41.04794"N	102°10'56.14212"W	3728.05	1245830.22	3964921.63	3807.15	LIPT	CAL
3030	37°44'45.37630"N	102°17'33.28332"W	3810.13	1408903.51	3927210.05	3887.83	LIPT	CAL
3031	37°48'07.51856"N	104°18'25.79688"W	5446.29	1415629.58	3344625.06	5510.96	LIPT	CAL
3032	37°24'42.78874"N	102°41'32.96004"W	4410.64	1283601.49	3815295.48	4485.78	LIPT	CAL
3033	37°26'32.43660"N	103°32'24.65412"W	5414.24	1288407.14	3568938.50	5482.56	LIPT	CAL
3034	37°01'05.76286"N	102°19'32.50452"W	3806.10	1143772.65	3926642.33	3885.17	LIPT	CAL
3035	37°33'24.32783"N	102°26'13.69608"W	4088.10	1338653.39	3887694.11	4164.86	LIPT	CAL
3036	37°12'00.90796"N	103°59'45.88620"W	5427.18	1197815.95	3438022.93	5491.72	LIPT	CAL
3037	38°23'04.36855"N	102°05'11.81868"W	3812.95	1643407.73	3978228.61	3890.03	LIPT	CAL
3038	37°36'26.05288"N	104°01'42.48624"W	5062.04	1345836.60	3426255.93	5129.24	LIPT	CAL
3039	37°40'06.80448"N	103°05'31.62588"W	4282.93	1373789.07	3696862.90	4355.47	LIPT	CAL
3040	37°29'57.49202"N	104°09'43.65972"W	5560.63	1305957.87	3388104.72	5626.05	LIPT	CAL

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	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
3041	38°01'17.57986"N	102°36'47.42172"W	3706.17	1506192.11	3831461.90	3782.52	LIPT	CAL
3042	37°46'02.40049"N	102°25'11.02800"W	4020.55	1415452.85	3890209.54	4097.42	LIPT	CAL
3043	37°09'35.54557"N	103°46'42.04452"W	5629.42	1184211.00	3501703.02	5694.77	LIPT	CAL
3044	37°27'17.29476"N	102°56'50.71776"W	4857.79	1297098.78	3740855.91	4930.72	LIPT	CAL
3045	37°42'06.72041"N	102°36'33.23016"W	4298.86	1389875.77	3836198.82	4374.30	LIPT	CAL
3046	37°17'36.45074"N	103°21'22.84272"W	5515.22	1235382.53	3623541.55	5584.15	LIPT	CAL
3047	37°55'54.04692"N	102°18'02.18052"W	3635.33	1476418.67	3922574.39	3713.10	LIPT	CAL
3048	37°08'55.40485"N	102°45'36.28008"W	4551.86	1187238.91	3798483.73	4626.94	LIPT	CAL
3049	37°31'41.07155"N	102°37'12.72000"W	4289.86	1326526.93	3834977.38	4365.39	LIPT	CAL
3050	37°33'29.20158"N	104°01'22.91196"W	5249.69	1327976.23	3428113.63	5316.58	LIPT	CAL
3051	37°49'23.10287"N	102°44'52.79568"W	4069.19	1432782.66	3794769.73	4143.97	LIPT	CAL
3052	37°07'04.26209"N	104°07'17.73156"W	5576.81	1167251.62	3401912.39	5640.10	LIPT	CAL
3053	37°11'23.62657"N	103°51'03.32820"W	5668.72	1194759.31	3480362.28	5733.77	LIPT	CAL
3054	37°46'44.37905"N	102°07'44.00544"W	3670.94	1422598.61	3974075.16	3749.70	LIPT	CAL
3055	37°28'15.49034"N	102°18'35.53668"W	3887.74	1308669.25	3925631.67	3965.31	LIPT	CAL
3057	38°23'48.91747"N	102°58'10.91460"W	4327.57	1639860.62	3725100.10	4401.73	LIPT	CAL
3058	37°33'53.39059"N	102°07'42.74472"W	3688.91	1344671.34	3976990.29	3767.23	LIPT	CAL
3058A	37°01'05.95567"N	102°04'51.50892"W	3533.99	1146313.35	3998049.77	3615.01	LIPT	CAL
3059	37°53'13.25724"N	103°20'43.43460"W	4065.15	1451524.74	3621740.40	4137.76	LIPT	CAL
3060	37°23'57.46524"N	103°20'55.85928"W	5319.46	1273959.27	3624834.02	5388.82	LIPT	CAL
3061	37°37'36.07972"N	104°11'37.22388"W	5442.95	1352207.17	3378305.59	5508.90	LIPT	CAL
3062	37°16'44.14037"N	104°12'40.42260"W	5483.84	1225523.38	3374969.00	5548.28	LIPT	CAL
3063	37°16'21.78750"N	103°51'57.50604"W	5372.37	1224834.45	3475451.45	5437.96	LIPT	CAL
3064	37°44'45.21872"N	102°53'37.10076"W	4299.79	1403480.17	3753504.62	4373.28	LIPT	CAL
3065	37°16'44.86076"N	103°01'54.00120"W	5063.21	1232497.82	3718100.55	5135.15	LIPT	CAL
3066	37°13'09.18772"N	103°36'22.47192"W	5716.63	1206785.47	3551410.67	5783.37	LIPT	CAL
3067	37°46'29.90824"N	103°09'50.66892"W	4112.24	1411997.46	3675073.56	4184.82	LIPT	CAL

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	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
3068	37°08'56.91361"N	102°08'58.40664"W	3723.33	1193191.47	3976330.24	3803.34	LIPT	CAL
3069	37°32'13.01744"N	102°54'24.57108"W	4510.50	1327322.18	3751805.27	4583.90	LIPT	CAL
3070	37°39'31.54597"N	102°18'04.79484"W	3933.13	1377092.84	3925767.39	4010.65	LIPT	CAL
3071	37°19'19.08941"N	104°01'51.85560"W	5169.63	1241967.13	3427135.46	5234.92	LIPT	CAL
3072	37°35'13.24417"N	103°59'40.83396"W	5350.73	1338629.35	3436162.32	5417.97	LIPT	CAL
3073	38°14'44.93627"N	102°18'41.68296"W	3700.30	1590636.63	3915507.61	3777.06	LIPT	CAL
3074	38°06'54.53338"N	102°02'40.36164"W	3457.24	1545812.18	3993908.56	3535.80	LIPT	CAL
3075	38°12'34.32838"N	103°22'32.30796"W	4081.73	1568739.11	3610344.27	4155.14	LIPT	CAL
3076	38°12'47.57033"N	103°08'34.77408"W	4195.54	1571681.54	3677138.59	4269.70	LIPT	CAL
2221000	37°53'46.55141"N	102°55'23.94192"W	3971.87	1457975.61	3743416.62	4045.99	LIPT	NVA
2222000	37°53'46.05569"N	102°55'24.13992"W	3972.05	1457925.05	3743402.14	4046.17	LIPT	VVA
2223000	37°53'45.84894"N	102°55'22.52928"W	3972.31	1457907.71	3743531.76	4046.44	LIPT	CAL
2231000	37°57'18.66910"N	102°36'46.31796"W	3752.03	1482040.45	3832296.98	3828.28	LIPT	NVA
2232000	37°57'18.71244"N	102°36'45.90252"W	3748.40	1482045.86	3832330.10	3824.65	LIPT	VVA
2233000	37°57'18.85910"N	102°36'46.55628"W	3752.30	1482059.07	3832277.31	3828.55	LIPT	CAL
2241000	37°33'24.92093"N	102°15'20.42532"W	3835.59	1340488.90	3940264.31	3913.24	LIPT	NVA
2242000	37°33'25.87057"N	102°15'20.21616"W	3836.44	1340585.47	3940277.81	3914.09	LIPT	VVA
2243000	37°33'25.40678"N	102°15'20.59524"W	3836.66	1340537.53	3940248.93	3914.31	LIPT	CAL
2251000	37°01'05.97335"N	102°03'48.58236"W	3525.35	1146502.37	4003149.89	3606.49	LIPT	NVA
2252000	37°09'48.34476"N	102°21'43.37856"W	3962.12	1196239.84	3914258.67	4040.44	LIPT	VVA
2253000	37°08'58.01629"N	102°16'38.69616"W	3887.07	1191992.03	3939083.16	3966.05	LIPT	CAL
2261000	37°44'44.57238"N	102°07'10.49520"W	3647.94	1410585.75	3977202.06	3726.66	LIPT	NVA
2262000	37°44'19.94053"N	102°04'26.20200"W	3541.27	1408576.65	3990480.17	3620.24	LIPT	VVA
2263000	37°44'44.20813"N	102°04'25.87728"W	3551.38	1411030.53	3990416.22	3630.38	LIPT	CAL
2271000	37°03'26.85474"N	102°45'36.50184"W	4315.80	1154022.11	3799440.35	4391.27	LIPT	NVA
2272000	37°00'21.74360"N	102°50'38.24052"W	4211.81	1134600.53	3775523.30	4286.58	LIPT	VVA
2273000	37°00'36.46361"N	102°50'45.43980"W	4214.85	1136072.17	3774897.25	4289.59	LIPT	CAL

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	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
2281000	37°32'06.30629"N	103°00'06.77628"W	4689.14	1325892.59	3724271.48	4761.81	LIPT	NVA
2282000	37°27'18.10721"N	102°51'22.94208"W	4657.88	1297915.92	3767272.50	4731.59	LIPT	VVA
2283000	37°28'09.82002"N	103°03'58.51584"W	4823.71	1301488.99	3706235.68	4895.64	LIPT	CAL
2291000	38°18'37.16035"N	102°54'26.97480"W	4144.62	1608824.04	3743796.78	4219.21	LIPT	NVA
2292000	38°17'45.24166"N	102°28'18.22872"W	3731.68	1607336.14	3868947.81	3807.90	LIPT	VVA
2293000	38°17'45.62372"N	102°28'17.88168"W	3731.96	1607375.66	3868974.21	3808.18	LIPT	CAL
2301000	38°13'45.17375"N	103°16'06.88548"W	4060.58	1576620.70	3640927.04	4134.35	LIPT	NVA
2302000	38°10'20.07059"N	103°14'04.92000"W	4094.34	1556113.64	3651159.33	4168.30	LIPT	VVA
2303000	38°13'09.84428"N	103°14'05.68284"W	4097.75	1573280.69	3650682.03	4171.65	LIPT	CAL
2311000	37°18'22.50227"N	103°11'33.52128"W	5274.22	1241173.34	3671033.97	5344.63	LIPT	NVA
2312000	37°36'00.98064"N	103°19'50.92356"W	4570.39	1347239.54	3628373.18	4641.15	LIPT	VVA
2313000	37°36'01.27454"N	103°19'50.47248"W	4573.85	1347270.10	3628408.78	4644.61	LIPT	CAL
2321000	37°35'08.95668"N	104°19'13.90368"W	5553.51	1336838.89	3341758.83	5618.24	LIPT	NVA
2322000	37°35'09.60086"N	104°19'13.56924"W	5550.23	1336904.38	3341784.92	5614.97	LIPT	VVA
2323000	37°35'09.54611"N	104°19'14.38212"W	5553.52	1336898.02	3341719.57	5618.26	LIPT	CAL
2391000	37°08'46.04226"N	104°07'14.90340"W	5527.40	1177548.22	3401989.44	5591.01	LIPT	NVA
2392000	37°02'41.76798"N	104°03'16.37856"W	5722.14	1141000.78	3421869.75	5785.02	LIPT	VVA
2393000	37°08'03.29640"N	103°59'37.20192"W	5577.02	1173797.70	3439113.00	5641.04	LIPT	CAL
2401000	37°39'33.49534"N	103°34'16.62096"W	4570.94	1367201.66	3558279.82	4640.97	LIPT	NVA
2402000	37°19'13.71763"N	103°36'39.15540"W	5553.84	1243620.12	3549315.87	5621.06	LIPT	VVA
2403000	37°19'16.47696"N	103°36'40.37292"W	5556.26	1243897.16	3549211.90	5623.48	LIPT	CAL
2421000	37°33'29.81858"N	104°01'23.37204"W	5250.17	1328038.05	3428075.60	5317.06	LIPT	NVA
2422000	37°20'14.79563"N	104°08'15.84096"W	5359.92	1247130.77	3396040.21	5425.03	LIPT	VVA
2423000	37°20'12.85742"N	104°08'14.38260"W	5359.04	1246936.48	3396160.83	5424.15	LIPT	CAL
5544	37°27'34.03076"N	104°12'22.06548"W	5485.39	1291269.31	3375542.06	5550.48	MFBC	NGS
5629	37°21'37.51744"N	104°15'07.26192"W	5570.60	1255032.52	3362705.79	5635.28	MFBC	NGS
D 435	37°04'48.00371"N	102°34'44.34168"W	4244.96	1163827.41	3852024.87	4321.96	MFIR	NGS

CWCB SOUTHEAST COLORADO MAPPING

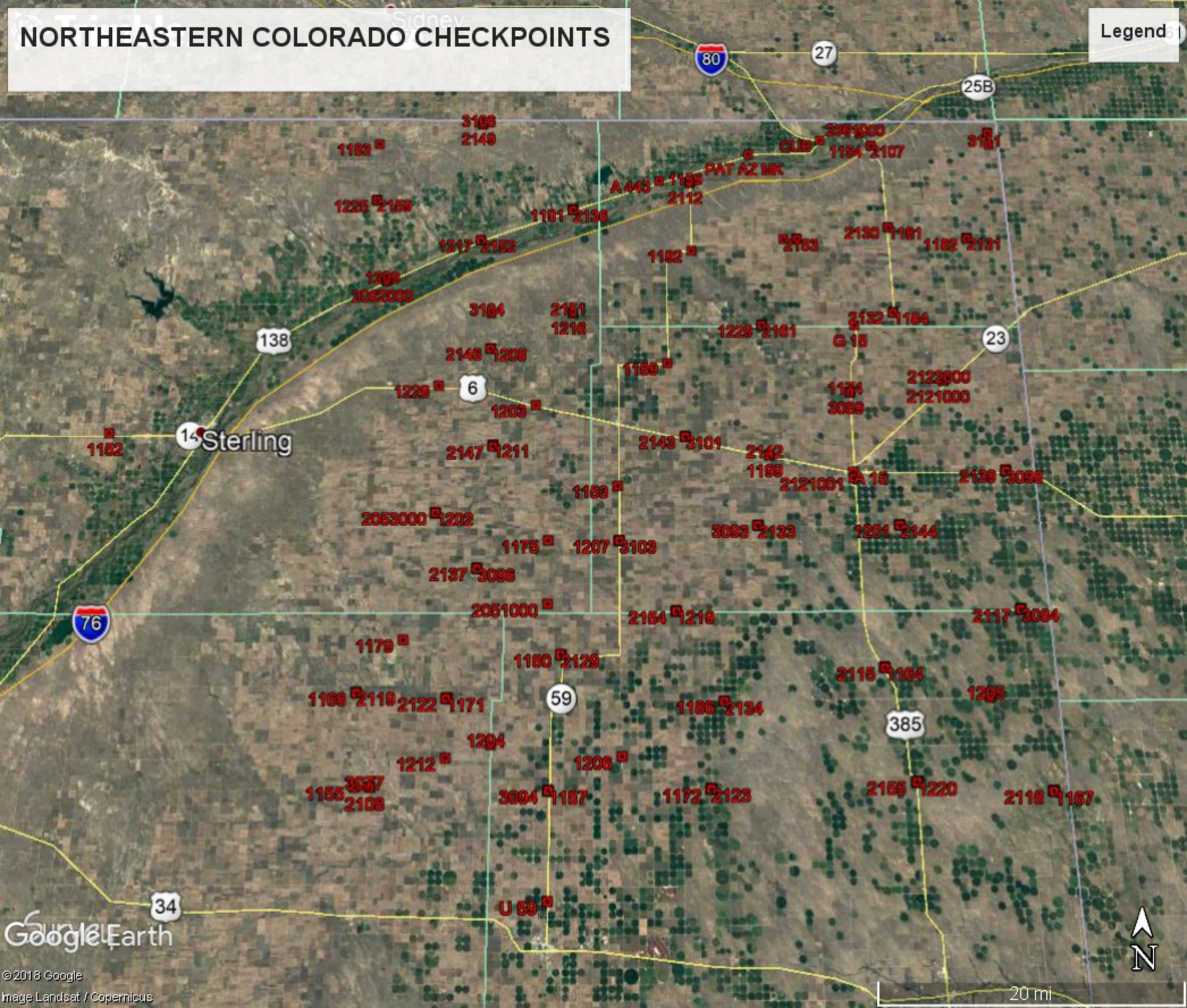
65220329

AUGUST 2019

PT#	NAD83(2011)		ELLIPSOID	COLORADO SOUTH ZONE		NAVD 88	CODE	NOTE
	LATITUDE	LONGITUDE	HEIGHT	STATE PLANE		ELEVATION		
			US FT	NORTHING	EASTING	GEOID 12B		
				US FT	US FT	US FT		
E 78	38°28'18.79939"N	102°05'15.21312"W	3857.38	1675185.44	3976796.73	3934.14	MFBC	NGS
F 435	37°08'56.46739"N	102°36'56.47608"W	4317.81	1188613.11	3840546.33	4394.26	MFIR	NGS
J 37	38°31'05.96554"N	102°47'09.20400"W	4178.66	1685534.20	3776474.69	4252.87	MFBC	NGS
J 38	37°53'46.79272"N	102°36'45.98496"W	3809.14	1460620.40	3832985.95	3885.24	MFBC	NGS
K 435	37°14'10.29516"N	102°36'54.61020"W	4342.55	1220344.04	3839717.20	4418.73	MFIR	NGS
L 433	38°01'51.56461"N	102°36'51.46776"W	3649.72	1509618.07	3831032.12	3726.08	MFIR	NGS
N 37	38°26'25.07186"N	102°43'50.67192"W	4071.71	1657593.16	3793089.57	4146.41	MFBC	NGS
N 432	38°02'48.48918"N	103°22'18.43320"W	3962.81	1509519.80	3612801.42	4035.99	MFIR	NGS
N 433	37°57'18.72457"N	102°36'45.63504"W	3749.01	1482047.75	3832351.48	3825.26	MFIR	NGS
P 69	37°34'45.08130"N	104°02'46.79592"W	5145.06	1335544.13	3421240.70	5211.97	MFBC	NGS
R 432	38°03'41.64091"N	103°15'44.70444"W	3843.25	1515630.58	3644158.70	3916.99	MFIR	NGS
R 435	37°22'02.71006"N	102°36'54.32652"W	4349.40	1268103.25	3838264.67	4425.24	MFIR	NGS
Y 439	38°05'35.56018"N	102°31'12.50616"W	3494.34	1533115.51	3857415.67	3571.14	MFIR	NGS
Z 432	38°05'06.59944"N	102°37'57.54180"W	3545.25	1529174.19	3825142.69	3621.56	MFIR	NGS
Z 441	37°56'27.15947"N	102°07'01.47576"W	3470.89	1481630.39	3975352.89	3549.71	MFIR	NGS

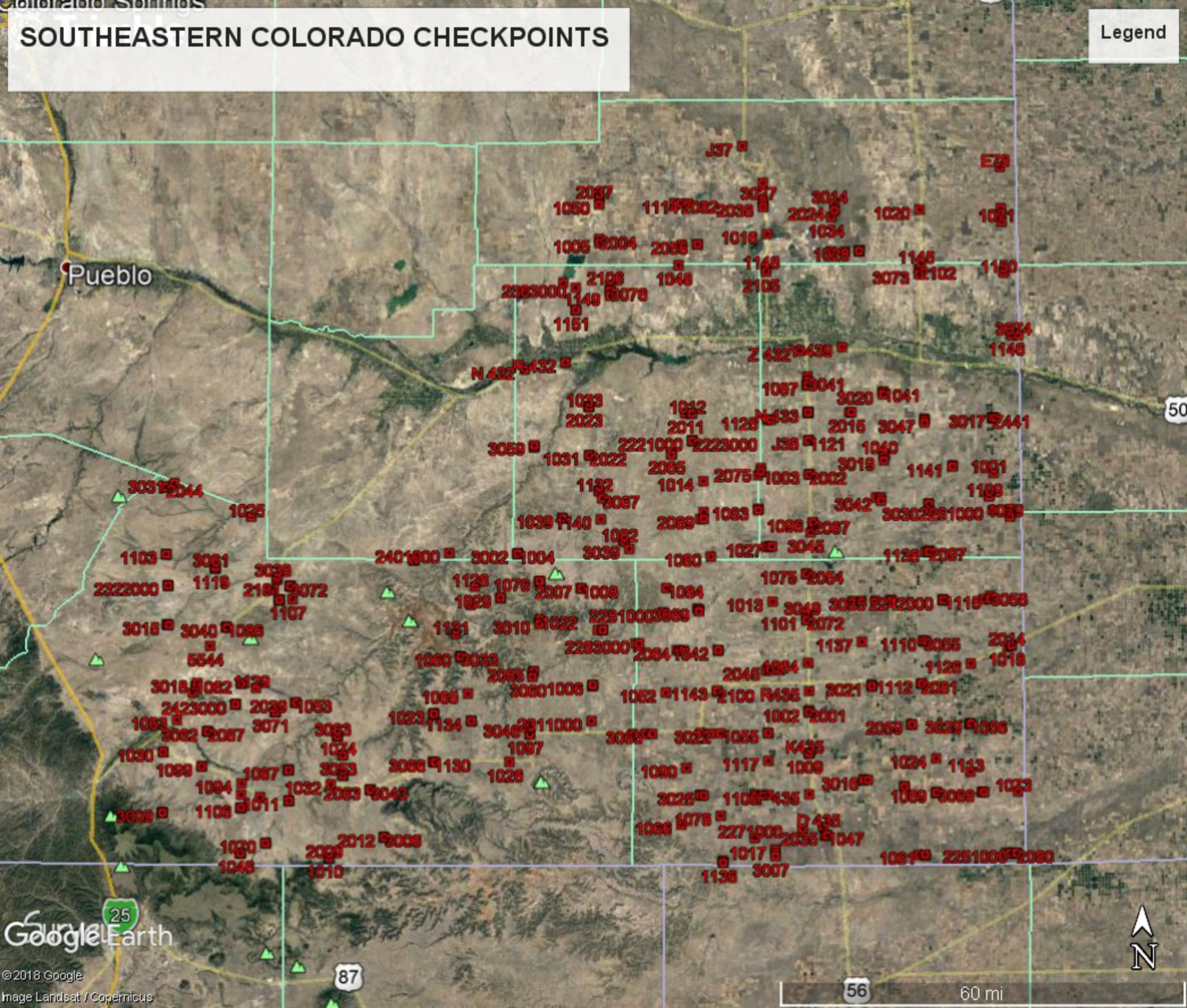
NORTHEASTERN COLORADO CHECKPOINTS

Legend



SOUTHEASTERN COLORADO CHECKPOINTS

Legend



Google Earth

© 2018 Google
Image Landsat / Copernicus



60 mi



The NGS Data Sheet

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

```

PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
LK0005 *****
LK0005 DESIGNATION -  A 15
LK0005 PID          -  LK0005
LK0005 STATE/COUNTY-  CO/PHILLIPS
LK0005 COUNTRY      -  US
LK0005 USGS QUAD    -  HOLYOKE (1971)
LK0005
LK0005                      *CURRENT SURVEY CONTROL
LK0005
LK0005 * NAD 83(2011) POSITION- 40 35 03.98345(N) 102 18 07.39721(W)  ADJUSTED
LK0005 * NAD 83(2011) ELLIP HT- 1118.251 (meters)          (06/27/12)  ADJUSTED
LK0005 * NAD 83(2011) EPOCH   - 2010.00
LK0005 * NAVD 88 ORTHO HEIGHT - 1139.291 (meters)          3737.82 (feet) ADJUSTED
LK0005
LK0005 GEOID HEIGHT   -          -21.037 (meters)          GEOID12B
LK0005 NAD 83(2011) X - -1,033,705.973 (meters)          COMP
LK0005 NAD 83(2011) Y - -4,740,186.939 (meters)          COMP
LK0005 NAD 83(2011) Z -  4,128,212.942 (meters)          COMP
LK0005 LAPLACE CORR   -           -3.46 (seconds)          DEFLEC12B
LK0005 DYNAMIC HEIGHT -          1138.480 (meters)          3735.16 (feet) COMP
LK0005 MODELED GRAVITY -          979,873.4 (mgal)          NAVD 88
LK0005
LK0005 VERT ORDER     -  FIRST      CLASS II
LK0005
LK0005 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
LK0005 Standards:
LK0005      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
LK0005      Horiz  Ellip              SD_N   SD_E   SD_h          (unitless)
LK0005 -----
LK0005 NETWORK      0.43   1.00              0.19   0.16   0.51          -0.05847245
LK0005 -----
LK0005 Click here for local accuracies and other accuracy information.
LK0005
LK0005
LK0005.The horizontal coordinates were established by GPS observations
LK0005.and adjusted by the National Geodetic Survey in June 2012.
LK0005
LK0005.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
LK0005.been affixed to the stable North American tectonic plate. See
LK0005.NA2011 for more information.
LK0005
LK0005.The horizontal coordinates are valid at the epoch date displayed above
LK0005.which is a decimal equivalence of Year/Month/Day.
LK0005
LK0005.The orthometric height was determined by differential leveling and
LK0005.adjusted by the NATIONAL GEODETIC SURVEY
LK0005.in June 1991.
LK0005
LK0005.Significant digits in the geoid height do not necessarily reflect accuracy.

```


LK0005.GEOID12B height accuracy estimate available [here](#).

LK0005

LK0005.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LK0005

LK0005.The Laplace correction was computed from DEFLEC12B derived deflections.

LK0005

LK0005.The ellipsoidal height was determined by GPS observations

LK0005.and is referenced to NAD 83.

LK0005

LK0005.The dynamic height is computed by dividing the NAVD 88

LK0005.geopotential number by the normal gravity value computed on the

LK0005.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

LK0005.degrees latitude (g = 980.6199 gals.).

LK0005

LK0005.The modeled gravity was interpolated from observed gravity values.

LK0005

LK0005. The following values were computed from the NAD 83(2011) position.

LK0005

LK0005;		North	East	Units	Scale Factor	Converg.
LK0005;SPC CO N	-	448,595.652	1,185,078.525	MT	0.99997377	+2 03 58.7
LK0005;SPC CO N	-	1,471,767.57	3,888,045.13	sFT	0.99997377	+2 03 58.7
LK0005;UTM 13	-	4,496,126.393	728,333.540	MT	1.00024179	+1 45 21.4

LK0005

LK0005! - Elev Factor x Scale Factor = Combined Factor

LK0005!SPC CO N - 0.99982461 x 0.99997377 = 0.99979839

LK0005!UTM 13 - 0.99982461 x 1.00024179 = 1.00006636

LK0005

LK0005_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TGE2833396126(NAD 83)

LK0005

LK0005 SUPERSEDED SURVEY CONTROL

LK0005

LK0005	NAD 83(2007)-	40 35 03.98335(N)	102 18 07.39786(W)	AD(2002.00)	0
LK0005	ELLIP H (02/10/07)	1118.281 (m)		GP(2002.00)	
LK0005	ELLIP H (12/03/02)	1118.277 (m)		GP()	4 2
LK0005	NAD 83(1992)-	40 35 03.98311(N)	102 18 07.39754(W)	AD()	1
LK0005	ELLIP H (11/30/99)	1118.303 (m)		GP()	4 1
LK0005	NAVD 88	1139.29 (m)	3737.8 (f)	LEVELING	3
LK0005	NGVD 29 (??/??/92)	1138.820 (m)	3736.28 (f)	ADJ UNCH	1 2

LK0005

LK0005.Superseded values are not recommended for survey control.

LK0005

LK0005.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LK0005.See file [dsdata.pdf](#) to determine how the superseded data were derived.

LK0005

LK0005_MARKER: DB = BENCH MARK DISK

LK0005_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

LK0005_STAMPING: A 15 1926 3736.279

LK0005_MARK LOGO: CGS

LK0005_PROJECTION: PROJECTING 5 CENTIMETERS

LK0005_MAGNETIC: N = NO MAGNETIC MATERIAL

LK0005_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

LK0005+STABILITY: SURFACE MOTION

LK0005_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LK0005+SATELLITE: SATELLITE OBSERVATIONS - February 16, 2016

LK0005

LK0005	HISTORY	- Date	Condition	Report By
LK0005	HISTORY	- 1926	MONUMENTED	CGS
LK0005	HISTORY	- 1942	GOOD	CGS
LK0005	HISTORY	- 19990222	GOOD	NGS
LK0005	HISTORY	- 20040420	GOOD	MSAM

LK0005 HISTORY - 20160216 GOOD INDIV
LK0005
LK0005 STATION DESCRIPTION
LK0005
LK0005 'DESCRIBED BY COAST AND GEODETIC SURVEY 1942
LK0005 'AT HOLYOKE.
LK0005 'AT HOLYOKE, AT THE SOUTHEAST CORNER OF THE INTERSECTION OF
LK0005 'INTEROCEAN AVENUE AND EMERSON STREET, AT THE NORTHWEST CORNER OF
LK0005 'THE COURTHOUSE YARD, 16.4 FEET SOUTH OF THE OUTSIDE EDGE OF THE
LK0005 'EAST-AND-WEST SIDEWALK, AND 2.4 FEET EAST OF THE INSIDE EDGE OF
LK0005 'THE NORTH-AND-SOUTH SIDEWALK. A STANDARD DISK, STAMPED 3736.279
LK0005 'A 15 1926 AND SET IN THE TOP OF A CONCRETE POST PROJECTING 6
LK0005 'INCHES ABOVE GROUND
LK0005
LK0005 STATION RECOVERY (1999)
LK0005
LK0005 'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (RSC)
LK0005 'THE STATION IS LOCATED IN THE TOWN OF HOLYOKE, IN THE NORTHWEST 1/4 OF
LK0005 'SECTION 17, T 7 N, R 44 W, AT U. S. HIGHWAY 385 MILEPOST 279.35.
LK0005 'OWNERSHIP--PHILLIPS COUNTY PROPERTY
LK0005 'TO REACH THE STATION, GO TO THE SOUTHEAST CORNER OF THE INTERSECTION
LK0005 'OF INTEROCEAN AVENUE AND EMERSON STREET IN HOLYOKE, AT THE NORTHWEST
LK0005 'CORNER OF THE PHILLIPS COUNTY COURTHOUSE YARD
LK0005 'THE MARK IS A STANDARD DISK SET INTO THE TOP OF A SQUARE 30 CM
LK0005 'CONCRETE POST PROJECTING 5 CM ABOVE THE GROUND. IT IS 16.0 M (52.5
LK0005 'FT) EAST FROM THE CENTER LINE OF SOUTH INTEROCEAN AVENUE, 12.2 M (40.0
LK0005 'FT) SOUTH FROM THE CENTER OF EAST EMERSON STREET, 5.2 M (17.1 FT)
LK0005 'SOUTH FROM A TELEPHONE POLE AND 3.9 M (12.8 FT) NORTHWEST FROM THE
LK0005 'NORTHERN MOST ONE OF THREE LEGS OF THE HOLYOKE ACTIVITIES SIGN.
LK0005
LK0005 STATION RECOVERY (2004)
LK0005
LK0005 'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 2004 (DJK)
LK0005 'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC. 2004 (DJK)
LK0005 '
LK0005 'RECOVERED AS DESCRIBED.
LK0005
LK0005 STATION RECOVERY (2016)
LK0005
LK0005 'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2016 (CHR)
LK0005 'FOUND 3.5 INCH USCGS BRASS DISK ON TOP OF 10 INCH BY 10 INCH CONCRETE
LK0005 'POST, 6 INCHES ABOVE WALK, NW OF COUNTY COURT HOUSE, TOOK PHOTO,
LK0005 'STAMPED
LK0005 'A 15 1926 3736.279

*** retrieval complete.
Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
LK0227 *****
LK0227 DESIGNATION -  A 17
LK0227 PID          -  LK0227
LK0227 STATE/COUNTY-  CO/LOGAN
LK0227 COUNTRY      -  US
LK0227 USGS QUAD    -  MERINO (1984)
LK0227
LK0227                      *CURRENT SURVEY CONTROL
LK0227
LK0227* NAD 83(2011) POSITION- 40 28 57.44062(N) 103 21 04.79801(W)  ADJUSTED
LK0227* NAD 83(2011) ELLIP HT- 1210.817 (meters)                (06/27/12)  ADJUSTED
LK0227* NAD 83(2011) EPOCH   - 2010.00
LK0227* NAVD 88 ORTHO HEIGHT - 1230.588 (meters)                4037.35 (feet) ADJUSTED
LK0227
LK0227 GEOID HEIGHT   -          -19.761 (meters)                GEOID12B
LK0227 NAD 83(2011) X - -1,122,049.856 (meters)                COMP
LK0227 NAD 83(2011) Y - -4,727,681.568 (meters)                COMP
LK0227 NAD 83(2011) Z -  4,119,678.442 (meters)                COMP
LK0227 LAPLACE CORR   -           -3.21 (seconds)                DEFLEC12B
LK0227 DYNAMIC HEIGHT -          1229.660 (meters)                4034.31 (feet) COMP
LK0227 MODELED GRAVITY -          979,828.0 (mgal)                NAVD 88
LK0227
LK0227 VERT ORDER     -  FIRST      CLASS II
LK0227
LK0227 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
LK0227 Standards:
LK0227      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
LK0227      Horiz  Ellip              SD_N   SD_E   SD_h          (unitless)
LK0227 -----
LK0227 NETWORK    0.29   0.49              0.13   0.10   0.25          0.06420953
LK0227 -----
LK0227 Click here for local accuracies and other accuracy information.
LK0227
LK0227
LK0227.The horizontal coordinates were established by GPS observations
LK0227.and adjusted by the National Geodetic Survey in June 2012.
LK0227
LK0227.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
LK0227.been affixed to the stable North American tectonic plate. See
LK0227.NA2011 for more information.
LK0227
LK0227.The horizontal coordinates are valid at the epoch date displayed above
LK0227.which is a decimal equivalence of Year/Month/Day.
LK0227
LK0227.The orthometric height was determined by differential leveling and
LK0227.adjusted by the NATIONAL GEODETIC SURVEY
LK0227.in June 1991.
LK0227
LK0227.Significant digits in the geoid height do not necessarily reflect accuracy.

```

LK0227.GEOID12B height accuracy estimate available [here](#).

LK0227

LK0227.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LK0227

LK0227.The Laplace correction was computed from DEFLEC12B derived deflections.

LK0227

LK0227.The ellipsoidal height was determined by GPS observations

LK0227.and is referenced to NAD 83.

LK0227

LK0227.The dynamic height is computed by dividing the NAVD 88

LK0227.geopotential number by the normal gravity value computed on the

LK0227.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

LK0227.degrees latitude (g = 980.6199 gals.).

LK0227

LK0227.The modeled gravity was interpolated from observed gravity values.

LK0227

LK0227. The following values were computed from the NAD 83(2011) position.

LK0227

LK0227;		North	East	Units	Scale Factor	Converg.
LK0227;SPC CO N	-	434,615.418	1,096,562.333	MT	0.99996501	+1 23 18.0
LK0227;SPC CO N	-	1,425,900.75	3,597,638.25	sFT	0.99996501	+1 23 18.0
LK0227;UTM 13	-	4,482,631.234	639,737.041	MT	0.99984036	+1 04 13.9

LK0227

LK0227! - Elev Factor x Scale Factor = Combined Factor

LK0227!SPC CO N - 0.99981010 x 0.99996501 = 0.99977511

LK0227!UTM 13 - 0.99981010 x 0.99984036 = 0.99965049

LK0227

LK0227_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFE3973782631(NAD 83)

LK0227

LK0227 SUPERSEDED SURVEY CONTROL

LK0227

LK0227	NAD 83(2007)-	40 28 57.44051(N)	103 21 04.79853(W)	AD(2002.00)	0
LK0227	ELLIP H (02/10/07)	1210.845 (m)		GP(2002.00)	
LK0227	ELLIP H (12/03/02)	1210.858 (m)		GP()	4 2
LK0227	ELLIP H (10/08/96)	1210.888 (m)		GP()	1 1
LK0227	NAD 83(1992)-	40 28 57.44004(N)	103 21 04.79794(W)	AD()	1
LK0227	ELLIP H (07/08/96)	1211.153 (m)		GP()	1 1
LK0227	NAVD 88	1230.59 (m)	4037.4 (f)	LEVELING	3
LK0227	NGVD 29 (??/??/92)	1229.992 (m)	4035.40 (f)	ADJ UNCH	1 2

LK0227

LK0227.Superseded values are not recommended for survey control.

LK0227

LK0227.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LK0227.See file [dsdata.pdf](#) to determine how the superseded data were derived.

LK0227

LK0227_MARKER: DB = BENCH MARK DISK

LK0227_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

LK0227_STAMPING: A 17 1926 4035.435

LK0227_MARK LOGO: CGS

LK0227_PROJECTION: RECESSED 36 CENTIMETERS

LK0227_MAGNETIC: H = BAR MAGNET SET IN DRILL HOLE

LK0227_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

LK0227+STABILITY: SURFACE MOTION

LK0227_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LK0227+SATELLITE: SATELLITE OBSERVATIONS - June 28, 1995

LK0227

LK0227	HISTORY	- Date	Condition	Report By
LK0227	HISTORY	- 1926	MONUMENTED	CGS
LK0227	HISTORY	- 1941	GOOD	CGS
LK0227	HISTORY	- 1984	GOOD	NGS

LK0227 HISTORY - 19950628 GOOD MSAM
 LK0227 HISTORY - 20071031 GOOD GEOCAC

LK0227

LK0227

LK0227

STATION DESCRIPTION

LK0227

LK0227'DESCRIBED BY COAST AND GEODETIC SURVEY 1941

LK0227'AT MERINO.

LK0227'AT MERINO, ON THE UNION PACIFIC RAILROAD, AT THE CROSSING OF THE

LK0227'MAIN STREET, 58 FEET NORTHEAST OF THE MAIN STREET, 42 FEET

LK0227'NORTHWEST OF THE NORTHWEST RAIL, 40 FEET NORTH OF THE NORTH CORNER

LK0227'OF THE FOOTING OF WARNING BELL 702, 36 FEET SOUTHEAST OF THE

LK0227'CENTERLINE OF U.S. HIGHWAY 6, 7 FEET NORTHEAST OF THE PROLONGATION

LK0227'OF THE NORTHEAST EDGE OF THE SIDEWALK, 3 FEET EAST OF A POLE, IN

LK0227'LINE WITH THE ROW OF POLES, AND ABOUT 3 INCHES UNDER GROUND. A

LK0227'STANDARD DISK, STAMPED 4035.435 A 17 1926 AND SET IN THE TOP OF A

LK0227'CONCRETE POST.

LK0227

LK0227

STATION RECOVERY (1984)

LK0227

LK0227'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1984

LK0227'RECOVERED IN GOOD CONDITION. A NEW DESCRIPTION FOLLOWS. IN MERINO,

LK0227'AT THE INTERSECTION OF U.S. HIGHWAY 61 (PLATTE STREET) AND COLORADO

LK0227'AVENUE, 17.7 M (58.1 FT) NORTHEAST OF THE CENTER OF THE AVENUE, 12.8

LK0227'M (42.0 FT) NORTHWEST OF THE NEAR RAIL OF THE UNION PACIFIC RAILROAD,

LK0227'AND 11.0 M (36.1 FT) SOUTHEAST OF THE CENTERLINE OF THE HIGHWAY.

LK0227'THE MARK IS 0.3 METERS SW FROM A WITNESS POST

LK0227'THE MARK IS 0.5 M BELOW THE TRACKS.

LK0227

LK0227

STATION RECOVERY (1995)

LK0227

LK0227'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 1995 (KCH)

LK0227'THE STATION IS LOCATED IN THE TOWN OF MERINO, IN THE SOUTHWEST 1/4 OF

LK0227'SECTION 18, T 6 N, R 53 W, AT US HIGHWAY 6 MILEPOST 391.9.

LK0227'OWNERSHIP--DEPT. OF TRANSPORTATION RIGHT-OF-WAY. TO REACH THE

LK0227'STATION FROM THE INTERSECTION OF US HIGHWAY 6 (PLATTE STREET) AND

LK0227'COLORADO AVENUE IN MERINO, GO TO THE SOUTHEAST CORNER OF THE

LK0227'INTERSECTION AND THE STATION. THE STATION IS A STANDARD DISK SET IN A

LK0227'12-INCH SQUARE CONCRETE POST RECESSED 40 CM BELOW GROUND. IT IS 17.7

LK0227'M (58.1 FT) NORTHEAST OF THE CENTER OF THE AVENUE, 12.8 M (42.0 FT)

LK0227'NORTHWEST OF THE NEAR RAIL OF THE UNION PACIFIC RAILROAD, 11.0 M (36.1

LK0227'FT) SOUTHEAST OF THE CENTERLINE OF THE HIGHWAY, 7.0 M (23.0 FT) WEST

LK0227'OF A WHITE AND ORANGE PVC MCI FIBER OPTIC LINE WARNING SIGN, 6.8 M

LK0227'(22.3 FT) NORTHEAST OF A WOODEN ATT FIBER OPTIC LINE WARNING SIGN, 0.6

LK0227'M (2.0 FT) WEST OF A WITNESS POST, 0.5 M (1.6 FT) NORTH-NORTHEAST OF A

LK0227'WITNESS POST, 0.3 M (1.0 FT) SOUTH-SOUTHEAST OF A WITNESS POST AND

LK0227'ABOUT 1.0 M (3.3 FT) BELOW THE TRACKS. NOTE--THE HORIZONTAL DATUM

LK0227'POINT IS A CENTER PUNCH IN THE CENTER OF A BAR INSIDE THE CIRCLE OF

LK0227'THE DISK.

LK0227

LK0227

STATION RECOVERY (2007)

LK0227

LK0227'RECOVERY NOTE BY GEOCACHING 2007 (TFW)

LK0227'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:06

The NGS Data Sheet

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

```

PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
LK0478 *****
LK0478 DESIGNATION -  A 442
LK0478 PID          -  LK0478
LK0478 STATE/COUNTY-  CO/LOGAN
LK0478 COUNTRY      -  US
LK0478 USGS QUAD    -  STERLING NORTH (1951)
LK0478
LK0478                      *CURRENT SURVEY CONTROL
LK0478
LK0478 * NAD 83(2011) POSITION- 40 40 34.12822(N) 103 09 59.08832(W) ADJUSTED
LK0478 * NAD 83(2011) ELLIP HT- 1169.375 (meters) (06/27/12) ADJUSTED
LK0478 * NAD 83(2011) EPOCH   - 2010.00
LK0478 * NAVD 88 ORTHO HEIGHT - 1189.165 (meters) 3901.45 (feet) ADJUSTED
LK0478
LK0478 GEOID HEIGHT   -      -19.789 (meters) GEOID12B
LK0478 NAD 83(2011) X - -1,103,593.703 (meters) COMP
LK0478 NAD 83(2011) Y - -4,717,633.286 (meters) COMP
LK0478 NAD 83(2011) Z -  4,135,976.347 (meters) COMP
LK0478 LAPLACE CORR   -      -3.13 (seconds) DEFLEC12B
LK0478 DYNAMIC HEIGHT -      1188.305 (meters) 3898.63 (feet) COMP
LK0478 MODELED GRAVITY -      979,860.3 (mgal) NAVD 88
LK0478
LK0478 VERT ORDER     -  FIRST      CLASS II
LK0478
LK0478 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
LK0478 Standards:
LK0478      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
LK0478      Horiz  Ellip              SD_N   SD_E   SD_h      (unitless)
LK0478 -----
LK0478 NETWORK    0.28   0.47              0.12   0.11   0.24      0.10860083
LK0478 -----
LK0478 Click here for local accuracies and other accuracy information.
LK0478
LK0478
LK0478 .The horizontal coordinates were established by GPS observations
LK0478 .and adjusted by the National Geodetic Survey in June 2012.
LK0478
LK0478 .NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
LK0478 .been affixed to the stable North American tectonic plate. See
LK0478 .NA2011 for more information.
LK0478
LK0478 .The horizontal coordinates are valid at the epoch date displayed above
LK0478 .which is a decimal equivalence of Year/Month/Day.
LK0478
LK0478 .The orthometric height was determined by differential leveling and
LK0478 .adjusted by the NATIONAL GEODETIC SURVEY
LK0478 .in June 1991.
LK0478
LK0478 .Significant digits in the geoid height do not necessarily reflect accuracy.

```

LK0478.GEOID12B height accuracy estimate available [here](#).

LK0478

LK0478.[Photographs](#) are available for this station.

LK0478

LK0478.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LK0478

LK0478.The Laplace correction was computed from DEFLEC12B derived deflections.

LK0478

LK0478.The ellipsoidal height was determined by GPS observations

LK0478.and is referenced to NAD 83.

LK0478

LK0478.The dynamic height is computed by dividing the NAVD 88

LK0478.geopotential number by the normal gravity value computed on the

LK0478.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

LK0478.degrees latitude (g = 980.6199 gals.).

LK0478

LK0478.The modeled gravity was interpolated from observed gravity values.

LK0478

LK0478. The following values were computed from the NAD 83(2011) position.

LK0478

LK0478;		North	East	Units	Scale Factor	Converg.
LK0478;SPC CO N	-	456,493.689	1,111,670.561	MT	0.99998436	+1 30 28.1
LK0478;SPC CO N	-	1,497,679.71	3,647,205.83	sFT	0.99998436	+1 30 28.1
LK0478;UTM 13	-	4,504,423.739	654,963.789	MT	0.99989558	+1 11 43.2
LK0478!	-	Elev Factor	x	Scale Factor	=	Combined Factor
LK0478!SPC CO N	-	0.99981660	x	0.99998436	=	0.99980096
LK0478!UTM 13	-	0.99981660	x	0.99989558	=	0.99971220

LK0478

LK0478_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFF5496304423(NAD 83)

LK0478

LK0478 SUPERSEDED SURVEY CONTROL

LK0478

LK0478	NAD 83(2007)-	40 40 34.12810(N)	103 09 59.08887(W)	AD(2002.00)	0
LK0478	ELLIP H (02/10/07)	1169.403 (m)		GP(2002.00)	
LK0478	ELLIP H (10/21/02)	1169.430 (m)		GP()	5 1
LK0478	ELLIP H (10/08/96)	1169.446 (m)		GP()	1 1
LK0478	NAD 83(1992)-	40 40 34.12762(N)	103 09 59.08832(W)	AD()	1
LK0478	ELLIP H (07/08/96)	1169.705 (m)		GP()	1 1
LK0478	NAVD 88	1189.17 (m)	3901.5 (f)	LEVELING	3

LK0478

LK0478.Superseded values are not recommended for survey control.

LK0478

LK0478.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LK0478.See file [dsdata.pdf](#) to determine how the superseded data were derived.

LK0478

LK0478_MARKER: I = METAL ROD

LK0478_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

LK0478_STAMPING: A 442 1986

LK0478_MARK LOGO: NGS

LK0478_PROJECTION: FLUSH

LK0478_MAGNETIC: I = MARKER IS A STEEL ROD

LK0478_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

LK0478_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LK0478+SATELLITE: SATELLITE OBSERVATIONS - November 26, 2012

LK0478_ROD/PIPE-DEPTH: 14.6 meters

LK0478

LK0478	HISTORY	- Date	Condition	Report By
LK0478	HISTORY	- 1986	MONUMENTED	NGS
LK0478	HISTORY	- 19950220	GOOD	MSAM

LK0478 HISTORY - 19950628 GOOD MSAM
 LK0478 HISTORY - 20060716 GOOD JCLS
 LK0478 HISTORY - 20071101 GOOD GEOCAC
 LK0478 HISTORY - 20121126 GOOD INDIV

LK0478

LK0478

LK0478

STATION DESCRIPTION

LK0478'DESCRIBED BY NATIONAL GEODETIC SURVEY 1986

LK0478'6.8 KM (4.2 MI) NE FROM STERLING.

LK0478'6.8 KM (4.2 MI) NORTHEAST ALONG US HIGHWAY US HIGHWAY 138 FROM THE

LK0478'POST OFFICE AT STERLING, AT A GRANITE MONUMENT FOR THE FIRST PUBLIC

LK0478'SCHOOL, 0.72 KM (0.45 MI) SOUTHWEST OF RAILROAD MILEPOLE NUMBER 53,

LK0478'11.5 METERS (37.7 FT) SOUTHWEST OF THE HIGHWAY CENTERLINE, 9.6 METERS

LK0478'(32 FT) WEST-NORTHWEST OF THE CENTER OF THE NORTHWEST END OF A 36-INCH

LK0478'PIPE CULVERT UNDER THE RAILROAD, 1.1 METERS (3.7 FT) SOUTHWEST OF THE

LK0478'SOUTHWEST FACE OF A 4 BY 2 FOOT GRANITE MONUMENT FOR THE FIRST SCHOOL

LK0478'HOUSE, 15.0 METERS (49.3 FT) NORTHWEST OF THE NORTHWEST RAIL OF THE

LK0478'UNION PACIFIC RAILROAD AND 8.1 METERS (26.6 FT) WEST-NORTHWEST OF

LK0478'RAILROAD CULVERT NUMBER 5345. NOTE--ACCESS TO DATUM POINT IS HAD

LK0478'THROUGH A 5-INCH LOGO CAP.

LK0478'THE MARK IS 0.15 M BELOW THE HIGHWAY.

LK0478

LK0478

STATION RECOVERY (1995)

LK0478

LK0478'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 1995 (KCH)

LK0478'RECOVERED AS DESCRIBED. STATION IS IN SECTION 10, T 8 N, R 52 W, ON

LK0478'THE SOUTHEAST SIDE OF STATE HIGHWAY 138 AT MILEPOST 4.2 .

LK0478

LK0478

STATION RECOVERY (1995)

LK0478

LK0478'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 1995 (KCH)

LK0478'ADDED A FIBERGLASS WITNESS POST (NOAA) 1 FT (0.3 M) SOUTH OF MARK.

LK0478

LK0478

STATION RECOVERY (2006)

LK0478

LK0478'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2006

LK0478'RECOVERED IN GOOD CONDITION.

LK0478

LK0478

STATION RECOVERY (2007)

LK0478

LK0478'RECOVERY NOTE BY GEOCACHING 2007 (TFW)

LK0478'RECOVERED IN GOOD CONDITION.

LK0478

LK0478

STATION RECOVERY (2012)

LK0478

LK0478'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2012 (NK)

LK0478'FOUND IN GOOD CONDITION

*** retrieval complete.

Elapsed Time = 00:00:06

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
LK0451 *****
LK0451 DESIGNATION -  A 443
LK0451 PID          -  LK0451
LK0451 STATE/COUNTY-  CO/SEDGWICK
LK0451 COUNTRY      -  US
LK0451 USGS QUAD    -  SEDGWICK (1953)
LK0451
LK0451                      *CURRENT SURVEY CONTROL
LK0451
LK0451 * NAD 83(2011) POSITION- 40 55 24.63181(N) 102 33 44.57381(W)  ADJUSTED
LK0451 * NAD 83(2011) ELLIP HT- 1076.925 (meters)                (06/27/12)  ADJUSTED
LK0451 * NAD 83(2011) EPOCH   - 2010.00
LK0451 * NAVD 88 ORTHO HEIGHT - 1097.001 (meters)                3599.08 (feet) ADJUSTED
LK0451
LK0451 GEOID HEIGHT   -          -20.090 (meters)                GEOID12B
LK0451 NAD 83(2011) X - -1,049,878.500 (meters)                COMP
LK0451 NAD 83(2011) Y - -4,711,414.572 (meters)                COMP
LK0451 NAD 83(2011) Z -  4,156,713.978 (meters)                COMP
LK0451 LAPLACE CORR   -           -2.29 (seconds)                DEFLEC12B
LK0451 DYNAMIC HEIGHT -          1096.272 (meters)                3596.69 (feet) COMP
LK0451 MODELED GRAVITY -          979,921.1 (mgal)                NAVD 88
LK0451
LK0451 VERT ORDER     -   FIRST      CLASS II
LK0451
LK0451 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
LK0451 Standards:
LK0451      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
LK0451      Horiz  Ellip              SD_N   SD_E   SD_h          (unitless)
LK0451 -----
LK0451 NETWORK    0.39   0.63              0.17   0.15   0.32          0.11844335
LK0451 -----
LK0451 Click here for local accuracies and other accuracy information.
LK0451
LK0451
LK0451.The horizontal coordinates were established by GPS observations
LK0451.and adjusted by the National Geodetic Survey in June 2012.
LK0451
LK0451.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
LK0451.been affixed to the stable North American tectonic plate. See
LK0451.NA2011 for more information.
LK0451
LK0451.The horizontal coordinates are valid at the epoch date displayed above
LK0451.which is a decimal equivalence of Year/Month/Day.
LK0451
LK0451.The orthometric height was determined by differential leveling and
LK0451.adjusted by the NATIONAL GEODETIC SURVEY
LK0451.in June 1991.
LK0451
LK0451.Significant digits in the geoid height do not necessarily reflect accuracy.

```

LK0451.GEOID12B height accuracy estimate available [here](#).

LK0451

LK0451.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LK0451

LK0451.The Laplace correction was computed from DEFLEC12B derived deflections.

LK0451

LK0451.The ellipsoidal height was determined by GPS observations

LK0451.and is referenced to NAD 83.

LK0451

LK0451.The dynamic height is computed by dividing the NAVD 88

LK0451.geopotential number by the normal gravity value computed on the

LK0451.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

LK0451.degrees latitude (g = 980.6199 gals.).

LK0451

LK0451.The modeled gravity was interpolated from observed gravity values.

LK0451

LK0451. The following values were computed from the NAD 83(2011) position.

LK0451

LK0451;	North	East	Units	Scale Factor	Converg.
LK0451;SPC CO N	- 485,465.891	1,161,805.522	MT	1.00002575	+1 53 53.1
LK0451;SPC CO N	- 1,592,732.68	3,811,690.28	sFT	1.00002575	+1 53 53.1
LK0451;UTM 13	- 4,533,126.883	705,253.162	MT	1.00011855	+1 35 50.4

LK0451

LK0451! - Elev Factor x Scale Factor = Combined Factor

LK0451!SPC CO N - 0.99983110 x 1.00002575 = 0.99985685

LK0451!UTM 13 - 0.99983110 x 1.00011855 = 0.99994963

LK0451

LK0451_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TGF0525333126(NAD 83)

LK0451

LK0451 SUPERSEDED SURVEY CONTROL

LK0451

LK0451	NAD 83(2007)-	40 55 24.63170(N)	102 33 44.57443(W)	AD(2002.00)	0
LK0451	ELLIP H (02/10/07)	1076.954 (m)		GP(2002.00)	
LK0451	ELLIP H (12/03/02)	1076.958 (m)		GP()	4 2
LK0451	ELLIP H (10/08/96)	1076.987 (m)		GP()	1 1
LK0451	NAD 83(1992)-	40 55 24.63123(N)	102 33 44.57393(W)	AD()	1
LK0451	ELLIP H (07/08/96)	1077.198 (m)		GP()	1 1
LK0451	NAVD 88	1097.00 (m)	3599.1	(f) LEVELING	3
LK0451	NGVD 29 (02/14/92)	1096.523 (m)	3597.51	(f) ADJUSTED	1 2

LK0451

LK0451.Superseded values are not recommended for survey control.

LK0451

LK0451.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LK0451.See file [dsdata.pdf](#) to determine how the superseded data were derived.

LK0451

LK0451_MARKER: I = METAL ROD

LK0451_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

LK0451_STAMPING: A 443 1986

LK0451_MARK LOGO: NGS

LK0451_PROJECTION: FLUSH

LK0451_MAGNETIC: I = MARKER IS A STEEL ROD

LK0451_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

LK0451_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LK0451+SATELLITE: SATELLITE OBSERVATIONS - June 29, 1995

LK0451_ROD/PIPE-DEPTH: 14.5 meters

LK0451

LK0451	HISTORY	- Date	Condition	Report By
LK0451	HISTORY	- 1986	MONUMENTED	NGS
LK0451	HISTORY	- 19950629	GOOD	NGS

LK0451

LK0451 STATION DESCRIPTION

LK0451

LK0451'DESCRIBED BY NATIONAL GEODETIC SURVEY 1986

LK0451'3.7 KM (2.3 MI) SW FROM SEDGWICK.

LK0451'0.08 KM (0.05 MI) SOUTH ALONG MAIN AVENUE FROM THE POST OFFICE IN
LK0451'SEDGWICK, THENCE 3.6 KM (2.25 MI) SOUTHWEST ALONG US HIGHWAY 138, AT A
LK0451'TRACK ROAD CROSSING OVER THE RAILROAD AND LEADING SOUTHEAST TO A
LK0451'PASTURE LAND, AT HIGHWAY MILEPOST 41, 11.1 METERS (36.3 FT) SOUTHEAST
LK0451'OF THE SOUTHEAST RAIL OF THE UNION PACIFIC RAILROAD, 10.4 METERS (34
LK0451'FT) SOUTHWEST OF THE CENTER OF A IRON GATE AND A ROAD LEADING INTO THE
LK0451'PASTURE, 0.3 METER (1 FT) NORTHWEST OF THE RIGHT OF WAY FENCE AND
LK0451'14.9 METERS (49 FT) EAST-NORTHEAST OF A RAILROAD 3/4 MILEPOLE (THREE
LK0451'BANDED POWER LINE POLE). NOTE--ACCESS TO DATUM POINT IS HAD THROUGH A
LK0451'5-INCH LOGO CAP.

LK0451'THE MARK IS 0.3 METERS NE FROM A WITNESS POST

LK0451'THE MARK IS 0.61 M BELOW THE RAILROAD.

LK0451

LK0451 STATION RECOVERY (1995)

LK0451

LK0451'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995 (RSC)

LK0451'THE STATION IS LOCATED ABOUT 5.4 MI (8.7 KM) SOUTH OF THE NORTHERN
LK0451'COLORADO-NEBRASKA STATE LINE, 2 MI (3.2 KM) SOUTHWEST OF SEDGWICK AND
LK0451'2 MI (3.2 KM) NORTHEAST OF DORSEY, IN THE NORTHERN 1/2 OF SECTION 23,
LK0451'T11 N, R 47 W, AT STATE HIGHWAY 138 MILEPOST 41.0. OWNERSHIP--UNION
LK0451'PACIFIC RAILROAD RIGHT-OF-WAY. TO REACH THE STATION FROM THE THE
LK0451'INTERSECTION OF MAIN STREET AND STATE HIGHWAY 138, GO SOUTHWEST 2.25
LK0451'MI (3.62 KM) TO THE STATION ON THE LEFT AT A RAILROAD CROSSING. THE
LK0451'STATION IS A PUNCH MARK TOP CENTER ON A STAINLESS STEEL ROD DRIVEN TO
LK0451'REFUSAL ENCASED IN A 5-INCH PVC PIPE WITH LOGO LID SET IN A 0.4 M (1.3
LK0451'FT) CONCRETE COLLAR FLUSH WITH THE GROUND. IT IS 42.2 M (138.5 FT)
LK0451'SOUTHEAST OF THE HIGHWAY, 37.0 M (121.4 FT) SOUTHEAST OF MILEPOST 41,
LK0451'29.5 M (96.8 FT) SOUTHEAST OF A MCI FIBER OPTIC WARNING POST NUMBER
LK0451'01640, 14.1 M (46.3 FT) SOUTHEAST OF THE NEAR RAIL, 10.0 M (32.8 FT)
LK0451'WEST-NORTHWEST OF THE CENTER OF A FIELD GATE, 0.4 M (1.3 FT)
LK0451'NORTH-NORTHEAST OF A WITNESS POST, 0.3 M (1.0 FT) NORTHWEST OF A
LK0451'BARBED WIRE FENCE AND ABOUT 0.6 M (2.0 FT) BELOW THE HIGHWAY.

*** retrieval complete.

Elapsed Time = 00:00:06

The NGS Data Sheet

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

```

PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
LK0414 *****
LK0414 DESIGNATION -  B 439
LK0414 PID          -  LK0414
LK0414 STATE/COUNTY-  CO/LOGAN
LK0414 COUNTRY      -  US
LK0414 USGS QUAD    -  PEETZ (1953)
LK0414
LK0414                      *CURRENT SURVEY CONTROL
LK0414
LK0414 * NAD 83(2011) POSITION- 40 55 17.18123(N) 103 06 56.69026(W)  ADJUSTED
LK0414 * NAD 83(2011) ELLIP HT- 1276.593 (meters)                (06/27/12)  ADJUSTED
LK0414 * NAD 83(2011) EPOCH   - 2010.00
LK0414 * NAVD 88 ORTHO HEIGHT - 1296.213 (meters)                4252.66 (feet) ADJUSTED
LK0414
LK0414 GEOID HEIGHT   -          -19.621 (meters)                GEOID12B
LK0414 NAD 83(2011) X - -1,095,400.324 (meters)                COMP
LK0414 NAD 83(2011) Y - -4,701,348.796 (meters)                COMP
LK0414 NAD 83(2011) Z -  4,156,671.073 (meters)                COMP
LK0414 LAPLACE CORR   -           -2.79 (seconds)                DEFLEC12B
LK0414 DYNAMIC HEIGHT -           1295.272 (meters)            4249.57 (feet) COMP
LK0414 MODELED GRAVITY -           979,853.1 (mgal)              NAVD 88
LK0414
LK0414 VERT ORDER     -  FIRST      CLASS II
LK0414
LK0414 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
LK0414 Standards:
LK0414      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
LK0414      Horiz  Ellip              SD_N   SD_E   SD_h          (unitless)
LK0414 -----
LK0414 NETWORK    0.36   0.59              0.16   0.13   0.30          0.07299350
LK0414 -----
LK0414 Click here for local accuracies and other accuracy information.
LK0414
LK0414
LK0414.The horizontal coordinates were established by GPS observations
LK0414.and adjusted by the National Geodetic Survey in June 2012.
LK0414
LK0414.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
LK0414.been affixed to the stable North American tectonic plate. See
LK0414.NA2011 for more information.
LK0414
LK0414.The horizontal coordinates are valid at the epoch date displayed above
LK0414.which is a decimal equivalence of Year/Month/Day.
LK0414
LK0414.The orthometric height was determined by differential leveling and
LK0414.adjusted by the NATIONAL GEODETIC SURVEY
LK0414.in June 1991.
LK0414
LK0414.Significant digits in the geoid height do not necessarily reflect accuracy.

```

LK0414.GEOID12B height accuracy estimate available [here](#).

LK0414

LK0414.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LK0414

LK0414.The Laplace correction was computed from DEFLEC12B derived deflections.

LK0414

LK0414.The ellipsoidal height was determined by GPS observations

LK0414.and is referenced to NAD 83.

LK0414

LK0414.The dynamic height is computed by dividing the NAVD 88

LK0414.geopotential number by the normal gravity value computed on the

LK0414.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

LK0414.degrees latitude (g = 980.6199 gals.).

LK0414

LK0414.The modeled gravity was interpolated from observed gravity values.

LK0414

LK0414. The following values were computed from the NAD 83(2011) position.

LK0414

LK0414;		North	East	Units	Scale Factor	Converg.
LK0414;SPC CO N	-	483,837.608	1,115,220.254	MT	1.00002533	+1 32 26.0
LK0414;SPC CO N	-	1,587,390.55	3,658,851.78	sFT	1.00002533	+1 32 26.0
LK0414;UTM 13	-	4,531,745.348	658,660.663	MT	0.99990984	+1 14 04.2

LK0414

LK0414! - Elev Factor x Scale Factor = Combined Factor

LK0414!SPC CO N - 0.99979979 x 1.00002533 = 0.99982512

LK0414!UTM 13 - 0.99979979 x 0.99990984 = 0.99970965

LK0414

LK0414_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFF5866031745(NAD 83)

LK0414

LK0414 SUPERSEDED SURVEY CONTROL

LK0414

LK0414	NAD 83(2007)-	40 55 17.18110(N)	103 06 56.69085(W)	AD(2002.00)	0
LK0414	ELLIP H (02/10/07)	1276.622 (m)		GP(2002.00)	
LK0414	ELLIP H (12/03/02)	1276.629 (m)		GP()	4 2
LK0414	ELLIP H (10/08/96)	1276.668 (m)		GP()	1 1
LK0414	NAD 83(1992)-	40 55 17.18052(N)	103 06 56.69043(W)	AD()	1
LK0414	ELLIP H (07/08/96)	1276.922 (m)		GP()	1 1
LK0414	NAVD 88	1296.21 (m)	4252.6 (f)	LEVELING	3

LK0414

LK0414.Superseded values are not recommended for survey control.

LK0414

LK0414.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LK0414.See file [dsdata.pdf](#) to determine how the superseded data were derived.

LK0414

LK0414_MARKER: I = METAL ROD

LK0414_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

LK0414_STAMPING: B 439 1985

LK0414_MARK LOGO: NGS

LK0414_PROJECTION: FLUSH

LK0414_MAGNETIC: O = OTHER; SEE DESCRIPTION

LK0414_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

LK0414_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LK0414+SATELLITE: SATELLITE OBSERVATIONS - June 28, 1995

LK0414_ROD/PIPE-DEPTH: 4.6 meters

LK0414

LK0414	HISTORY	- Date	Condition	Report By
LK0414	HISTORY	- 1985	MONUMENTED	NGS
LK0414	HISTORY	- 19950628	GOOD	MSAM

LK0414

LK0414

STATION DESCRIPTION

LK0414

LK0414'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985

LK0414'4.8 KM (3.0 MI) SOUTH FROM PEETZ.

LK0414'0.24 KM (0.15 MI) EAST ALONG MAIN STREET FROM THE POST OFFICE AT

LK0414'PEETZ, THENCE 4.6 KM (2.85 MI) SOUTH ALONG STATE ROUTE 113, 14.2

LK0414'METERS (46.7 FT) WEST OF THE HIGHWAY CENTERLINE, 22.5 METERS (73.7 FT)

LK0414'WEST OF HIGHWAY MARKER 13 AND 0.3 METER (1 FT) EAST OF A FENCE.

LK0414'NOTE--ACCESS TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.

LK0414'THE MARK IS 0.3 METERS SE FROM A WITNESS POST

LK0414'THE MARK IS 0.3 M BELOW THE HIGHWAY.

LK0414

LK0414 STATION RECOVERY (1995)

LK0414

LK0414'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 1995 (KCH)

LK0414'RECOVERED AS DESCRIBED.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
LK0437 *****
LK0437 DESIGNATION - CUB
LK0437 PID - LK0437
LK0437 STATE/COUNTY- CO/SEDGWICK
LK0437 COUNTRY - US
LK0437 USGS QUAD - JULESBURG (1984)
LK0437
LK0437 *CURRENT SURVEY CONTROL
LK0437
LK0437* NAD 83(2011) POSITION- 40 58 29.48382(N) 102 19 10.24893(W) ADJUSTED
LK0437* NAD 83(2011) ELLIP HT- 1052.719 (meters) (06/27/12) ADJUSTED
LK0437* NAD 83(2011) EPOCH - 2010.00
LK0437* NAVD 88 ORTHO HEIGHT - 1073.095 (meters) 3520.65 (feet) ADJUSTED
LK0437
LK0437 GEOID HEIGHT - -20.376 (meters) GEOID12B
LK0437 NAD 83(2011) X - -1,029,096.740 (meters) COMP
LK0437 NAD 83(2011) Y - -4,712,152.850 (meters) COMP
LK0437 NAD 83(2011) Z - 4,161,005.747 (meters) COMP
LK0437 LAPLACE CORR - -3.56 (seconds) DEFLEC12B
LK0437 DYNAMIC HEIGHT - 1072.391 (meters) 3518.34 (feet) COMP
LK0437 MODELED GRAVITY - 979,931.0 (mgal) NAVD 88
LK0437
LK0437 VERT ORDER - FIRST CLASS II
LK0437
LK0437 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
LK0437 Standards:
LK0437 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
LK0437 Horiz Ellip SD_N SD_E SD_h (unitless)
LK0437 -----
LK0437 NETWORK 0.46 0.78 0.20 0.17 0.40 0.08839005
LK0437 -----
LK0437 Click here for local accuracies and other accuracy information.
LK0437
LK0437
LK0437.The horizontal coordinates were established by GPS observations
LK0437.and adjusted by the National Geodetic Survey in June 2012.
LK0437
LK0437.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
LK0437.been affixed to the stable North American tectonic plate. See
LK0437.NA2011 for more information.
LK0437
LK0437.The horizontal coordinates are valid at the epoch date displayed above
LK0437.which is a decimal equivalence of Year/Month/Day.
LK0437
LK0437.The orthometric height was determined by differential leveling and
LK0437.adjusted by the NATIONAL GEODETIC SURVEY
LK0437.in June 1991.
LK0437
LK0437.Significant digits in the geoid height do not necessarily reflect accuracy.

```

LK0437.GEOID12B height accuracy estimate available [here](#).

LK0437

LK0437.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LK0437

LK0437.The Laplace correction was computed from DEFLEC12B derived deflections.

LK0437

LK0437.The ellipsoidal height was determined by GPS observations

LK0437.and is referenced to NAD 83.

LK0437

LK0437.The dynamic height is computed by dividing the NAVD 88

LK0437.geopotential number by the normal gravity value computed on the

LK0437.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

LK0437.degrees latitude (g = 980.6199 gals.).

LK0437

LK0437.The modeled gravity was interpolated from observed gravity values.

LK0437

LK0437. The following values were computed from the NAD 83(2011) position.

LK0437

LK0437;		North	East	Units	Scale Factor	Converg.
LK0437;SPC CO N	-	491,870.326	1,182,046.734	MT	1.00003669	+2 03 18.1
LK0437;SPC CO N	-	1,613,744.56	3,878,098.33	sFT	1.00003669	+2 03 18.1
LK0437;SPC NE	-	129,357.330	304,854.887	MT	0.99970125	-1 32 13.7
LK0437;SPC NE	-	424,399.84	1,000,178.08	sFT	0.99970125	-1 32 13.7
LK0437;UTM 13	-	4,539,426.585	725,530.334	MT	1.00022607	+1 45 30.3

LK0437

LK0437! Elev Factor x Scale Factor = Combined Factor

LK0437!SPC CO N - 0.99983490 x 1.00003669 = 0.99987158

LK0437!SPC NE - 0.99983490 x 0.99970125 = 0.99953620

LK0437!UTM 13 - 0.99983490 x 1.00022607 = 1.00006093

LK0437

LK0437:	Primary Azimuth Mark	Grid Az
LK0437:SPC CO N	- CUB AZ MK	313 46 12.5
LK0437:SPC NE	- CUB AZ MK	317 21 44.3
LK0437:UTM 13	- CUB AZ MK	314 04 00.3

LK0437

LK0437_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TGF2553039426(NAD 83)

LK0437

LK0437	PID	Reference Object	Distance	Geod. Az
LK0437				dddmmss.s
LK0437	CP6929	CUB RM 1	7.323 METERS	02820
LK0437	CP6930	CUB RM 2	6.430 METERS	15434
LK0437	LK0516	OVID MUNICIPAL TANK	APPROX. 5.5 KM	2580352.9
LK0437	CP6925	CUB AZ MK		3154930.6

LK0437

LK0437 SUPERSEDED SURVEY CONTROL

LK0437

LK0437	NAD 83(2007)-	40 58 29.48369(N)	102 19 10.24959(W)	AD(2002.00)	0
LK0437	ELLIP H (02/10/07)	1052.748 (m)		GP(2002.00)	
LK0437	ELLIP H (12/03/02)	1052.740 (m)		GP()	4 2
LK0437	ELLIP H (10/08/96)	1052.767 (m)		GP()	1 1
LK0437	NAD 83(1992)-	40 58 29.48328(N)	102 19 10.24902(W)	AD()	1
LK0437	ELLIP H (07/08/96)	1053.003 (m)		GP()	1 1
LK0437	NAD 83(1992)-	40 58 29.47958(N)	102 19 10.25005(W)	AD()	3
LK0437	NAD 83(1986)-	40 58 29.47878(N)	102 19 10.24989(W)	AD()	3
LK0437	NAD 27	- 40 58 29.50560(N)	102 19 08.58150(W)	AD()	3
LK0437	NAVD 88	1073.10 (m)	3520.7 (f)	LEVELING	3
LK0437	NGVD 29 (02/14/92)	1072.632 (m)	3519.13 (f)	ADJUSTED	1 2
LK0437	NGVD 29 (07/19/86)	1072.9 (m)	3520. (f)	VERT ANG	

LK0437

LK0437.Superseded values are not recommended for survey control.

LK0437

LK0437.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LK0437.See file [dsdata.pdf](#) to determine how the superseded data were derived.

LK0437

LK0437_MARKER: DS = TRIANGULATION STATION DISK

LK0437_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

LK0437_STAMPING: CUB 1963

LK0437_MARK LOGO: CGS

LK0437_PROJECTION: FLUSH

LK0437_MAGNETIC: N = NO MAGNETIC MATERIAL

LK0437_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

LK0437+STABILITY: SURFACE MOTION

LK0437_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LK0437+SATELLITE: SATELLITE OBSERVATIONS - February 22, 1999

LK0437

LK0437	HISTORY	- Date	Condition	Report By
LK0437	HISTORY	- 1963	MONUMENTED	CGS
LK0437	HISTORY	- 1971	GOOD	USGS
LK0437	HISTORY	- 19810415	GOOD	NGS
LK0437	HISTORY	- 1986	GOOD	NGS
LK0437	HISTORY	- 19950629	GOOD	NGS
LK0437	HISTORY	- 19990222	GOOD	NGS

LK0437

LK0437 STATION DESCRIPTION

LK0437

LK0437'DESCRIBED BY COAST AND GEODETIC SURVEY 1963 (DJF)

LK0437'THE STATION IS LOCATED 4 MILES EAST-NORTHEAST OF OVID, 3

LK0437'MILES WEST-SOUTHWEST OF JULESBURG, 100 FEET SOUTHWEST OF THE

LK0437'NORTHWEST CORNER OF THE RUNWAY OF THE JULESBURG MUNICIPAL

LK0437'AIRPORT.

LK0437'

LK0437'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAY 138

LK0437'AND 385 IN JULESBURG, GO WESTERLY ON U.S. HIGHWAY 138 AND

LK0437'385 FOR 3.3 MILES TO WHERE THE TWO HIGHWAYS DIVIDE. CONTINUE

LK0437'STRAIGHT AHEAD AND GO SOUTHWEST ON U.S. HIGHWAY 138 FOR

LK0437'0.15 MILE TO THE STATION ON THE LEFT AS DESCRIBED.

LK0437'

LK0437'TO REACH THE AZIMUTH MARK FROM THE STATION GO NORTHEAST ON

LK0437'U.S. HIGHWAY 138 FOR 0.15 MILE TO THE JUNCTION OF U.S. HIGHWAY

LK0437'385. TURN LEFT AND GO WESTERLY ON U.S. HIGHWAY 385 FOR 0.3

LK0437'MILE TO THE MARK ON THE LEFT AS DESCRIBED.

LK0437'

LK0437'THE STATION MARK IS A STANDARD DISK SET IN THE TOP OF A 12-INCH

LK0437'CONCRETE CYLINDER WHICH IS SET FLUSH AND IS STAMPED CUB 1963.

LK0437'IT IS 98 FEET SOUTHWEST OF THE NORTHWEST CORNER OF THE AIRPORT

LK0437'RUNWAY, 55 FEET SOUTHEAST OF THE CENTER OF U.S. HIGHWAY 138,

LK0437'46 FEET WEST-SOUTHWEST OF THE SOUTHWEST CORNER OF A SMALL

LK0437'BUILDING, 6 FEET NORTHEAST OF A FENCE CORNER AND 3.3 FEET

LK0437'SOUTHEAST OF A METAL WITNESS POST.

LK0437'

LK0437'REFERENCE MARK NO. 1 IS A STANDARD DISK SET IN THE TOP OF

LK0437'A 12-INCH CONCRETE CYLINDER WHICH IS SET FLUSH AND IS STAMPED

LK0437'CUB NO 1 1963. IT IS 52 FEET SOUTHEAST OF THE CENTER OF U.S.

LK0437'HIGHWAY 138, 19-1/2 FEET WEST OF THE NORTHWEST CORNER OF A

LK0437'SMALL BUILDING AND 1 FOOT SOUTHEAST OF A FENCE LINE.

LK0437'

LK0437'REFERENCE MARK NO. 2 IS A STANDARD DISK SET IN THE TOP OF A

LK0437'12-INCH CONCRETE CYLINDER WHICH IS SET FLUSH AND IS STAMPED

LK0437'CUB NO 2 1963. IT IS 96 FEET SOUTHWEST OF THE SOUTHWEST
LK0437'EDGE OF THE RUNWAY, 61 FEET SOUTH-SOUTHWEST OF THE SOUTHWEST
LK0437'CORNER OF A SMALL BUILDING AND 42-1/2 FEET SOUTHEAST OF A
LK0437'FENCE CORNER.

LK0437'

LK0437'THE AZIMUTH MARK IS A STANDARD DISK SET IN THE TOP OF A 12-INCH
LK0437'CONCRETE CYLINDER WHICH PROJECTS 6 INCHES AND IS STAMPED
LK0437'CUB 1963. IT IS 41 FEET SOUTH-SOUTHWEST OF THE CENTER OF
LK0437'U.S. HIGHWAY 385, 21 FEET EAST OF THE CENTER OF A GRAVELED
LK0437'ROAD, 3.4 FEET WEST-NORTHWEST OF A METAL WITNESS POST AND 1
LK0437'FOOT NORTH-NORTHEAST OF A FENCE LINE.

LK0437

LK0437

STATION RECOVERY (1971)

LK0437

LK0437'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1971 (EEM)
LK0437'THIS STATION WAS NOT OCCUPIED, THUS DISTANCES AND DIRECTIONS
LK0437'TO THE REFERENCE MARKS WERE NOT REMEASURED.

LK0437'

LK0437'STATION AND REFERENCE MARKS WERE RECOVERED AS DESCRIBED, WITH
LK0437'THE FOLLOWING EXCEPTION--THE SMALL BUILDING REFERRED TO HAS
LK0437'BEEN REMOVED, HOWEVER, THE FOUNDATION STILL REMAINS.

LK0437'

LK0437'THE STATION AND REFERENCE MARKS ARE STANDARD USC AND GS
LK0437'BRONZE DISKS SET IN CONCRETE POSTS.

LK0437'

LK0437'STATION MARK--DISK IS FLUSH WITH THE GROUND, AND STAMPED
LK0437'CUB 1963.

LK0437'

LK0437'REFERENCE MARK NO. 1--DISK SET 0.2 FEET BELOW GROUND LEVEL,
LK0437'AND STAMPED CUB NO. 1 1963.

LK0437'

LK0437'REFERENCE MARK NO. 2--DISK SET 0.1 FEET BELOW GROUND LEVEL,
LK0437'AND STAMPED CUB NO. 2 1963.

LK0437

LK0437

STATION RECOVERY (1981)

LK0437

LK0437'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1981 (CLN)
LK0437'STATION RECOVERED AND ALL MARKS ARE IN GOOD CONDITION. STATION MARK,
LK0437'REFERENCE MARKS 1 AND 2 ARE NOW BELOW GROUND SURFACE. THE AZIMUTH
LK0437'MARK WAS BLOCKED TO STATION BY VERY LARGE JOHN DEER EQUIPEMENT AT TIME
LK0437'OF RECOVERY. DISTANCE AND DIRECTION TO REFERENCE MARKS COMPARED
LK0437'FAVORABLY PREVIOUS DATA. STATION IS REACHED FROM THE JUNCTION OF U.S.
LK0437'HIGHWAYS 385 AND 138 IN JULESBURG. GO WESTERLY AND SOUTHWEST ON
LK0437'COMBINATION OF HIGHWAYS FOR 3.3 MILES (5.3 KM) TO THE JUNCTION OF THE
LK0437'TWO HIGHWAYS. CONTINUE STRAIGHT AHEAD, SOUTHWEST ON HIGHWAY 138 FOR
LK0437'0.15 MILE (0.24 KM) TO AN OLD FENCE CORNER AND STATION ON LEFT, AS
LK0437'DESCRIBED. AZIMUTH MARK IS REACHED FROM THE STATION, GO NORTHEAST ON
LK0437'HIGHWAY 138 FOR 0.15 TO THE JUNCTION WITH HIGHWAY 385. TURN LEFT AND
LK0437'GO WEST, ON HIGHWAY 385 FOR 0.3 MILES (0.5 KM) TO A GRAVELED ROAD AND
LK0437'MARK ON LEFT.

LK0437'

LK0437'STATION IS A STANDARD DISK STAMPED--CUB 1963--, SET IN TOP OF A ROUND
LK0437'CONCRETE MONUMENT 3 INCHES BELOW SURFACE, 48 FEET (14.6 M) SOUTHWEST
LK0437'OF NORTHWEST CORNER OF JULESBURG NORTH-SOUTH AIR PORT RUNWAY, 55 FEET
LK0437'(16.8 M) SOUTHEAST OF CENTER OF 45 HIGHWAY 138, 5.5 FEET (1.7 M)
LK0437'NORTH-NORTHEAST OF A ROUND WOOD FENCE CORNER POST, 3.3 FEET (1.0 M)
LK0437'SOUTHEAST OF A HURRICANE FENCE LINE AND METAL WITNESS POST, 1.5 FEET
LK0437'(0.5 M) NORTHEAST OF A METAL WITNESS POST.

LK0437'

LK0437'REFERENCE MARK 1 IS A STANDARD DISK STAMPED--CUB NO 1 1963--, SET IN

LK0437'TOP OF A ROUND CONCRETE MONUMENT 6 INCHES BELOW GROUND, 52 FEET (15.8
LK0437'M) SOUTHEAST OF THE HIGHWAY, 1.2 FEET (0.4 M) SOUTH OF A LARGE ROUND
LK0437'FENCE POST, 1 FOOT (0.3 M) SOUTHEAST OF THE HURRICANE FENCE LINE.

LK0437'

LK0437'REFERENCE MARK 2 IS A STANDARD DISK STAMPED--CUB NO 2 1963--, SET IN
LK0437'TOP OF A ROUND CONCRETE MONUMENT 6 INCHES BELOW GROUND, 4 INCHES
LK0437'NORTHEAST OF AN OLD FENCE LINE.

LK0437'

LK0437'AZIMUTH MARK IS A STANDARD DISK STAMPED--CUB 1963--, SET IN TOP OF
LK0437'AROUND CONCRETE MONUMENT PROJECTING 6 INCHES, 40 FEET (12.2 M)
LK0437'SOUTH-SOUTHWEST OF CENTER OF U.S. HIGHWAY 385, 21 FEET (6.4 M) NORTH
LK0437'OF GRAVELED ROAD, 3.4 FEET (1.0 M) WEST-NORTHWEST OF A METAL WITNESS
LK0437'POST.

LK0437

LK0437

STATION RECOVERY (1986)

LK0437

LK0437'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1986

LK0437'5.5 KM (3.4 MI) WEST FROM JULESBURG.

LK0437'5.5 KM (3.4 MI) WEST ALONG US HIGHWAY 138 FROM THE JUNCTION OF MAIN
LK0437'STREET (US HIGHWAY 385) IN JULESBURG, 0.24 KM (0.15 MI) SOUTHWEST OF A
LK0437'FORK IN THE HIGHWAY (US HIGHWAY 385 LEADING NORTHWEST), AT THE CORNER
LK0437'OF THE AIRPORT RUNWAY, 16.8 METERS (55 FT) SOUTHEAST OF THE CENTERLINE
LK0437'OF THE HIGHWAY (US HIGHWAY 138), 29.3 METERS (96 FT) SOUTHEAST OF THE
LK0437'SOUTHWEST CORNER OF THE ASPHALT RUNWAY, 0.91 METER (3 FT) EAST OF A
LK0437'RIGHT OF WAY FENCE LINE AND 0.30 METER (1 FT) WEST OF A SNOW FENCE
LK0437'LINE.

LK0437'THE MARK IS 0.61 METERS NE FROM A WITNESS POST

LK0437'THE MARK IS 0.3 M BELOW THE HIGHWAY.

LK0437

LK0437

STATION RECOVERY (1995)

LK0437

LK0437'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995 (RSC)

LK0437'THE STATION IS LOCATED ABOUT 3.8 MI (6.1 KM) EAST-NORTHEAST OF OVID, 3
LK0437'MI (4.8 KM) WEST-SOUTHWEST OF JULESBURG AND 0.1 MI (0.2 KM) SOUTHWEST
LK0437'OF THE U. S. HIGHWAY 385 AND U. S. HIGHWAY 138 INTERSECTION, IN
LK0437'THE SOUTHWEST 1/4 OF SECTION 36, T 12 N, R 45 W, AT U. S. HIGHWAY
LK0437'138 MILEPOST 54.65. OWNERSHIP--JULESBURG MUNICIPAL AIRPORT. TO REACH
LK0437'THE STATION FROM THE INTERSECTION OF U. S. HIGHWAY 385 AND U. S.
LK0437'HIGHWAY 138 WEST OF JULESBURG, GO SOUTHWEST ON U. S. HIGHWAY 138 FOR
LK0437'0.1 MI (0.2 KM) TO THE STATION ON THE LEFT, AT THE END OF THE RUNWAY.
LK0437'THE STATION IS A STANDARD DISK SET IN A SQUARE CONCRETE POST RECESSED
LK0437'3 CM BELOW THE GROUND. IT IS 37.8 M (124.0 FT) WEST OF THE CENTER OF
LK0437'THE END OF THE RUNWAY END WITH A LINE OF LIGHTS, 16.7 M (54.8 FT)
LK0437'SOUTH-SOUTHEAST OF THE CENTER LINE OF U. S. HIGHWAY 138, 1.1 M (3.6
LK0437'FT) SOUTH-SOUTHEAST OF THE RIGHT-OF-WAY FENCE, 0.9 M (3.0 FT)
LK0437'SOUTHWEST OF A PLASTIC RIGHT-OF-WAY FENCE, 0.5 M (1.6 FT)
LK0437'EAST-NORTHEAST OF A METAL WITNESS POST AND ABOUT 0.6 M (2.0 FT) BELOW
LK0437'THE HIGHWAY.

LK0437

LK0437

STATION RECOVERY (1999)

LK0437

LK0437'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (RSC)

LK0437'RECOVERED AS DESCRIBED.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

```

PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
KJ0151 *****
KJ0151 FBN          -  This is a Federal Base Network Control Station.
KJ0151 DESIGNATION -  D 73
KJ0151 PID          -  KJ0151
KJ0151 STATE/COUNTY-  CO/YUMA
KJ0151 COUNTRY     -  US
KJ0151 USGS QUAD   -  ABARR (1974)
KJ0151
KJ0151                      *CURRENT SURVEY CONTROL
KJ0151
KJ0151 * NAD 83(2011) POSITION- 39 47 13.73087(N) 102 42 24.35569(W)  ADJUSTED
KJ0151 * NAD 83(2011) ELLIP HT- 1281.954 (meters) (06/27/12)  ADJUSTED
KJ0151 * NAD 83(2011) EPOCH   - 2010.00
KJ0151 * NAVD 88 ORTHO HEIGHT - 1303.713 (meters) 4277.27 (feet) ADJUSTED
KJ0151
KJ0151 GEOID HEIGHT   -      -21.735 (meters) GEOID12B
KJ0151 NAD 83(2011) X - -1,079,757.573 (meters) COMP
KJ0151 NAD 83(2011) Y - -4,788,625.662 (meters) COMP
KJ0151 NAD 83(2011) Z -  4,060,673.403 (meters) COMP
KJ0151 LAPLACE CORR   -      -5.37 (seconds) DEFLEC12B
KJ0151 DYNAMIC HEIGHT -      1302.616 (meters) 4273.67 (feet) COMP
KJ0151 MODELED GRAVITY -      979,739.3 (mgal) NAVD 88
KJ0151
KJ0151 VERT ORDER     -  SECOND CLASS 0
KJ0151
KJ0151 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
KJ0151 Standards:
KJ0151          FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
KJ0151          Horiz Ellip              SD_N   SD_E   SD_h          (unitless)
KJ0151 -----
KJ0151 NETWORK      0.41   0.80              0.18   0.15   0.41          0.08108826
KJ0151 -----
KJ0151 Click here for local accuracies and other accuracy information.
KJ0151
KJ0151
KJ0151.The horizontal coordinates were established by GPS observations
KJ0151.and adjusted by the National Geodetic Survey in June 2012.
KJ0151
KJ0151.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
KJ0151.been affixed to the stable North American tectonic plate. See
KJ0151.NA2011 for more information.
KJ0151
KJ0151.The horizontal coordinates are valid at the epoch date displayed above
KJ0151.which is a decimal equivalence of Year/Month/Day.
KJ0151
KJ0151.The orthometric height was determined by differential leveling and
KJ0151.adjusted by the NATIONAL GEODETIC SURVEY
KJ0151.in June 1991.
KJ0151

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KJ0151.Significant digits in the geoid height do not necessarily reflect accuracy.
KJ0151.GEOID12B height accuracy estimate available [here](#).
KJ0151
KJ0151.[Photographs](#) are available for this station.
KJ0151
KJ0151.The X, Y, and Z were computed from the position and the ellipsoidal ht.
KJ0151
KJ0151.The Laplace correction was computed from DEFLEC12B derived deflections.
KJ0151
KJ0151.The ellipsoidal height was determined by GPS observations
KJ0151.and is referenced to NAD 83.
KJ0151
KJ0151.The dynamic height is computed by dividing the NAVD 88
KJ0151.geopotential number by the normal gravity value computed on the
KJ0151.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
KJ0151.degrees latitude (g = 980.6199 gals.).
KJ0151
KJ0151.The modeled gravity was interpolated from observed gravity values.
KJ0151
KJ0151. The following values were computed from the NAD 83(2011) position.
KJ0151
KJ0151;
KJ0151;SPC CO N - North East Units Scale Factor Converg.
KJ0151;SPC CO N - 358,955.479 1,153,623.746 MT 0.99998937 +1 48 17.3
KJ0151;SPC CO N - 1,177,673.10 3,784,847.24 sFT 0.99998937 +1 48 17.3
KJ0151;UTM 13 - 4,406,648.618 696,365.847 MT 1.00007474 +1 28 04.8
KJ0151
KJ0151!
KJ0151!SPC CO N - Elev Factor x Scale Factor = Combined Factor
KJ0151!SPC CO N - 0.99979892 x 0.99998937 = 0.99978830
KJ0151!UTM 13 - 0.99979892 x 1.00007474 = 0.99987365
KJ0151
KJ0151_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SFE9636506648(NAD 83)
KJ0151
KJ0151
KJ0151 SUPERSEDED SURVEY CONTROL
KJ0151
KJ0151 NAD 83(2007)- 39 47 13.73080(N) 102 42 24.35614(W) AD(2002.00) 0
KJ0151 ELLIP H (02/10/07) 1281.983 (m) GP(2002.00)
KJ0151 ELLIP H (09/24/02) 1281.995 (m) GP() 3 1
KJ0151 NAD 83(1986)- 39 47 13.72552(N) 102 42 24.35488(W) AD() 3
KJ0151 NAD 83(1992)- 39 47 13.73045(N) 102 42 24.35591(W) AD() B
KJ0151 ELLIP H (05/26/92) 1281.997 (m) GP() 4 1
KJ0151 NAVD 88 1303.71 (m) 4277.3 (f) LEVELING 3
KJ0151 NGVD 29 (??/??/92) 1303.124 (m) 4275.33 (f) ADJ UNCH 2 0
KJ0151 NGVD 29 1303.12 (m) 4275.3 (f) LEVELING 3
KJ0151
KJ0151.Superseded values are not recommended for survey control.
KJ0151
KJ0151.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
KJ0151.See file [dsdata.pdf](#) to determine how the superseded data were derived.
KJ0151
KJ0151_MARKER: DB = BENCH MARK DISK
KJ0151_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
KJ0151_STAMPING: D 73 1935
KJ0151_MARK LOGO: CGS
KJ0151_PROJECTION: FLUSH
KJ0151_MAGNETIC: O = OTHER; SEE DESCRIPTION
KJ0151_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
KJ0151+STABILITY: SURFACE MOTION
KJ0151_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
KJ0151+SATELLITE: SATELLITE OBSERVATIONS - June 23, 1998
KJ0151

KJ0151	HISTORY	- Date	Condition	Report By
KJ0151	HISTORY	- 1935	MONUMENTED	CGS
KJ0151	HISTORY	- 1942	GOOD	CGS
KJ0151	HISTORY	- 19910421	GOOD	NGS
KJ0151	HISTORY	- 19980623	GOOD	CODOT

KJ0151

KJ0151

STATION DESCRIPTION

KJ0151

KJ0151'DESCRIBED BY COAST AND GEODETIC SURVEY 1942

KJ0151'4.3 MI S FROM ABARR.

KJ0151'4.3 MILES SOUTH ALONG STATE HIGHWAY 59 FROM THE POST OFFICE AT ABARR,
 KJ0151'YUMA COUNTY, AT THE JUNCTION OF A ROAD LEADING EAST, 20 FEET NORTHEAST
 KJ0151'OF THE NORTHEAST CORNER OF A SMALL STEEL CATTLE GUARD, 53 FEET EAST OF
 KJ0151'THE CENTERLINE OF THE HIGHWAY, AND 30 FEET EAST OF A FENCE LINE. A
 KJ0151'STANDARD DISK, STAMPED D 73 1935 AND SET IN THE TOP OF A CONCRETE
 KJ0151'POST.

KJ0151

KJ0151

STATION RECOVERY (1991)

KJ0151

KJ0151

KJ0151'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1991
 KJ0151'STATION IS LOCATED ABOUT 35 KM (21.7 MI) SOUTH OF YUMA, 15 KM
 KJ0151'(9.3 MI) NORTH-NORTHWEST OF JOES, ALONG STATE HIGHWAY 59, AT MILE
 KJ0151'80.5, IN FENCED RANGE, ACROSS THE HIGHWAY FROM A CATTLE WINDBREAK, IN
 KJ0151'THE SOUTHWEST CORNER OF SECTION 13, T 3 S, R 48 W. OWNERSHIP--CLARE
 KJ0151'E. SMITH, 9357 HIGHWAY 59, YUMA, CO 80759. PHONE IS 303-358-4274.
 KJ0151'TO REACH FROM THE JOES POST OFFICE, GO WEST ON US HIGHWAY 36 FOR 2.2
 KJ0151'KM (1.4 MI) TO THE JUNCTION WITH STATE HIGHWAY 59. TURN RIGHT,
 KJ0151'NORTH, ON HIGHWAY 59 FOR 10.89 KM (6.77 MI) TO ROAD 13 ON THE RIGHT
 KJ0151'AT OLD CONCRETE SCHOOL BUILDING. CONTINUE AHEAD FOR 3.25 KM
 KJ0151'(2.02 MI) TO AN OVERGROWN GRAVEL ROAD LEFT, A TRACK ROAD RIGHT AND
 KJ0151'THE STATION ON THE RIGHT.

KJ0151'STATION MARK IS SET IN THE TOP OF A 20-CM SQUARE CONCRETE POST
 KJ0151'PROJECTING 10 CM. IT IS 30.9 M (101.4 FT) EAST OF, AND SLIGHTLY
 KJ0151'LOWER THAN THE HIGHWAY CENTER, 8.1 M (26.6 FT) NORTH OF THE TRACK
 KJ0151'ROAD CENTER, 7.7 M (25.3 FT) EAST OF A FIBERGLASS WITNESS POST IN THE
 KJ0151'RIGHT-OF-WAY FENCE, AND 7.9 M (25.9 FT) NORTHEAST OF THE SOUTHEAST
 KJ0151'CORNER OF A CONCRETE FRAME FOR A CATTLE GUARD.

KJ0151'DESCRIBED BY G.R.HEID

KJ0151

KJ0151

STATION RECOVERY (1998)

KJ0151

KJ0151'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1998 (KAW)

KJ0151'RECOVERED AS DESCRIBED.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
LK0010 *****
LK0010 DESIGNATION -  G 15
LK0010 PID          -  LK0010
LK0010 STATE/COUNTY-  CO/PHILLIPS
LK0010 COUNTRY      -  US
LK0010 USGS QUAD    -  HOLYOKE NE (1962)
LK0010
LK0010                                *CURRENT SURVEY CONTROL
LK0010
LK0010 * NAD 83(2011) POSITION- 40 44 56.23006(N) 102 17 12.22713(W) ADJUSTED
LK0010 * NAD 83(2011) ELLIP HT- 1129.469 (meters) (06/27/12) ADJUSTED
LK0010 * NAD 83(2011) EPOCH   - 2010.00
LK0010 * NAVD 88 ORTHO HEIGHT - 1150.151 (meters) 3773.45 (feet) ADJUSTED
LK0010
LK0010 GEOID HEIGHT   -      -20.692 (meters) GEOID12B
LK0010 NAD 83(2011) X - -1,029,906.006 (meters) COMP
LK0010 NAD 83(2011) Y - -4,728,837.237 (meters) COMP
LK0010 NAD 83(2011) Z -  4,142,079.782 (meters) COMP
LK0010 LAPLACE CORR   -      -3.03 (seconds) DEFLEC12B
LK0010 DYNAMIC HEIGHT -      1149.359 (meters) 3770.86 (feet) COMP
LK0010 MODELED GRAVITY -      979,896.2 (mgal) NAVD 88
LK0010
LK0010 VERT ORDER     -  FIRST      CLASS II
LK0010
LK0010 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
LK0010 Standards:
LK0010      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
LK0010      Horiz  Ellip              SD_N   SD_E   SD_h      (unitless)
LK0010 -----
LK0010 NETWORK    0.37   0.98              0.17   0.12   0.50      -0.02389513
LK0010 -----
LK0010 Click here for local accuracies and other accuracy information.
LK0010
LK0010
LK0010.The horizontal coordinates were established by GPS observations
LK0010.and adjusted by the National Geodetic Survey in June 2012.
LK0010
LK0010.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
LK0010.been affixed to the stable North American tectonic plate. See
LK0010.NA2011 for more information.
LK0010
LK0010.The horizontal coordinates are valid at the epoch date displayed above
LK0010.which is a decimal equivalence of Year/Month/Day.
LK0010
LK0010.The orthometric height was determined by differential leveling and
LK0010.adjusted by the NATIONAL GEODETIC SURVEY
LK0010.in June 1991.
LK0010
LK0010.Significant digits in the geoid height do not necessarily reflect accuracy.

```

LK0010.GEOID12B height accuracy estimate available [here](#).

LK0010

LK0010.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LK0010

LK0010.The Laplace correction was computed from DEFLEC12B derived deflections.

LK0010

LK0010.The ellipsoidal height was determined by GPS observations

LK0010.and is referenced to NAD 83.

LK0010

LK0010.The dynamic height is computed by dividing the NAVD 88

LK0010.geopotential number by the normal gravity value computed on the

LK0010.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

LK0010.degrees latitude (g = 980.6199 gals.).

LK0010

LK0010.The modeled gravity was interpolated from observed gravity values.

LK0010

LK0010. The following values were computed from the NAD 83(2011) position.

LK0010

LK0010;		North	East	Units	Scale Factor	Converg.
LK0010;SPC CO N	-	466,898.996	1,185,713.241	MT	0.99999460	+2 04 34.3
LK0010;SPC CO N	-	1,531,817.79	3,890,127.52	sFT	0.99999460	+2 04 34.3
LK0010;UTM 13	-	4,514,430.833	729,066.622	MT	1.00024589	+1 46 18.6

LK0010

LK0010! - Elev Factor x Scale Factor = Combined Factor

LK0010!SPC CO N - 0.99982286 x 0.99999460 = 0.99981746

LK0010!UTM 13 - 0.99982286 x 1.00024589 = 1.00006870

LK0010

LK0010_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TGF2906614430(NAD 83)

LK0010

LK0010 SUPERSEDED SURVEY CONTROL

LK0010

LK0010	NAD 83(2007)-	40 44 56.22995(N)	102 17 12.22782(W)	AD(2002.00)	0
LK0010	ELLIP H (02/10/07)	1129.498 (m)		GP(2002.00)	
LK0010	ELLIP H (09/24/01)	1129.482 (m)		GP()	4 1
LK0010	NAD 83(1995)-	40 44 56.22946(N)	102 17 12.22756(W)	AD()	B
LK0010	ELLIP H (06/25/96)	1129.522 (m)		GP()	1 1
LK0010	NAVD 88	1150.15 (m)	3773.5 (f)	LEVELING	3
LK0010	NGVD 29 (??/??/92)	1149.692 (m)	3771.95 (f)	ADJ UNCH	1 2

LK0010

LK0010.Superseded values are not recommended for survey control.

LK0010

LK0010.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LK0010.See file [dsdata.pdf](#) to determine how the superseded data were derived.

LK0010

LK0010_MARKER: DB = BENCH MARK DISK

LK0010_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

LK0010_STAMPING: G 15 1926 3771.948

LK0010_MARK LOGO: CGS

LK0010_PROJECTION: PROJECTING 20 CENTIMETERS

LK0010_MAGNETIC: N = NO MAGNETIC MATERIAL

LK0010_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

LK0010+STABILITY: SURFACE MOTION

LK0010_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LK0010+SATELLITE: SATELLITE OBSERVATIONS - April 20, 2004

LK0010

LK0010	HISTORY	- Date	Condition	Report By
LK0010	HISTORY	- 1926	MONUMENTED	CGS
LK0010	HISTORY	- 1941	GOOD	CGS
LK0010	HISTORY	- 19951003	GOOD	CODOT
LK0010	HISTORY	- 19990222	GOOD	NGS

LK0010 HISTORY - 20040420 GOOD MSAM

LK0010

LK0010

STATION DESCRIPTION

LK0010

LK0010'DESCRIBED BY COAST AND GEODETIC SURVEY 1941

LK0010'12 MI N FROM HOLYOKE.

LK0010'ABOUT 12 MILES NORTH ALONG STATE HIGHWAY 51 FROM HOLYOKE, AT THE

LK0010'PHILLIPS-SEDGWICK COUNTY LINE, 47.6 FEET EAST OF THE HIGHWAY, 28.8

LK0010'FEET SOUTH OF AN EAST-AND-WEST FENCE, AND 2.3 FEET WEST OF A NORTH

LK0010'-AND-SOUTH FENCE. A STANDARD DISK, STAMPED 3771.948 G 15 1926 AND

LK0010'SET IN THE TOP OF A CONCRETE POST PROJECTING 6 INCHES ABOVE

LK0010'GROUND.

LK0010

LK0010

STATION RECOVERY (1995)

LK0010

LK0010'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1995 (JS)

LK0010'THE STATION IS LOCATED ABOUT 16.5 MI (26.6 KM) SOUTH OF JULESBURG,

LK0010'11.0 MI (17.7 KM) NORTH OF HOLYOKE AND AT THE PHILLIPS-SEDGWICK COUNTY

LK0010'LINE, AT THE NORTHWEST 1/4 OF SECTION 20, T 9 N, R 44 W, AT U.S.

LK0010'HIGHWAY 385 MILEPOST 290.85. OWNERSHIP--COLORADO DEPT. OF

LK0010'TRANSPORTATION RIGHT-OF-WAY. TO REACH THE STATION FROM THE JUNCTION

LK0010'OF U.S. HIGHWAY 385 AND INTERSTATE 76 SOUTH OF JULESBURG, GO SOUTH ON

LK0010'U.S. HIGHWAY 385 FOR 18.65 MI (30.01 KM) TO THE STATION ON THE LEFT AT

LK0010'THE COUNTY LINE. THE STATION IS A DISK IN THE TOP OF A SQUARE

LK0010'CONCRETE POST PROJECTING 20 CM ABOVE THE GROUND. IT IS 17.0 M (55.8

LK0010'FT) SOUTH OF THE EXTENDED CENTER OF THE SEDGWICK COUNTY ROAD 2 AND

LK0010'PHILLIPS COUNTY ROAD 44, 14.45 M (47.41 FT) EAST OF THE CENTER LINE OF

LK0010'U.S. HIGHWAY 385, 5.0 M (16.4 FT) EAST-SOUTHEAST OF THE SEDGWICK

LK0010'COUNTY SIGN, 0.75 M (2.46 FT) SOUTHWEST OF A WITNESS POST, 0.35 M

LK0010'(1.15 FT) SOUTH OF AN ANGLE IRON, 0.25 M (0.82 FT) NORTH-NORTHEAST OF

LK0010'A WITNESS POST AND ABOUT 30 CM ABOVE THE HIGHWAY.

LK0010

LK0010

STATION RECOVERY (1999)

LK0010

LK0010'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (RSC)

LK0010'RECOVERED AS DESCRIBED.

LK0010

LK0010

STATION RECOVERY (2004)

LK0010

LK0010'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 2004 (DJK)

LK0010'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC. 2004 (DJK)

LK0010'

LK0010'RECOVERED AS DESCRIBED.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
LK0444 *****
LK0444 DESIGNATION - PAT AZ MK
LK0444 PID - LK0444
LK0444 STATE/COUNTY- CO/SEDGWICK
LK0444 COUNTRY - US
LK0444 USGS QUAD - OVID (1984)
LK0444
LK0444 *CURRENT SURVEY CONTROL
LK0444
LK0444 * NAD 83(2011) POSITION- 40 57 26.16221(N) 102 25 41.07195(W) ADJUSTED
LK0444 * NAD 83(2011) ELLIP HT- 1058.869 (meters) (06/27/12) ADJUSTED
LK0444 * NAD 83(2011) EPOCH - 2010.00
LK0444 * NAVD 88 ORTHO HEIGHT - 1079.093 (meters) 3540.32 (feet) ADJUSTED
LK0444
LK0444 GEOID HEIGHT - -20.211 (meters) GEOID12B
LK0444 NAD 83(2011) X - -1,038,299.960 (meters) COMP
LK0444 NAD 83(2011) Y - -4,711,449.872 (meters) COMP
LK0444 NAD 83(2011) Z - 4,159,534.561 (meters) COMP
LK0444 LAPLACE CORR - -3.15 (seconds) DEFLEC12B
LK0444 DYNAMIC HEIGHT - 1078.384 (meters) 3538.00 (feet) COMP
LK0444 MODELED GRAVITY - 979,929.4 (mgal) NAVD 88
LK0444
LK0444 VERT ORDER - FIRST CLASS II
LK0444
LK0444 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
LK0444 Standards:
LK0444 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
LK0444 Horiz Ellip SD_N SD_E SD_h (unitless)
LK0444 -----
LK0444 NETWORK 0.39 0.63 0.17 0.15 0.32 0.11665794
LK0444 -----
LK0444 Click here for local accuracies and other accuracy information.
LK0444
LK0444
LK0444.The horizontal coordinates were established by GPS observations
LK0444.and adjusted by the National Geodetic Survey in June 2012.
LK0444
LK0444.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
LK0444.been affixed to the stable North American tectonic plate. See
LK0444.NA2011 for more information.
LK0444
LK0444.The horizontal coordinates are valid at the epoch date displayed above
LK0444.which is a decimal equivalence of Year/Month/Day.
LK0444
LK0444.The orthometric height was determined by differential leveling and
LK0444.adjusted by the NATIONAL GEODETIC SURVEY
LK0444.in June 1991.
LK0444
LK0444.Significant digits in the geoid height do not necessarily reflect accuracy.

```

LK0444.GEOID12B height accuracy estimate available [here](#).

LK0444

LK0444.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LK0444

LK0444.The Laplace correction was computed from DEFLEC12B derived deflections.

LK0444

LK0444.The ellipsoidal height was determined by GPS observations

LK0444.and is referenced to NAD 83.

LK0444

LK0444.The dynamic height is computed by dividing the NAVD 88

LK0444.geopotential number by the normal gravity value computed on the

LK0444.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

LK0444.degrees latitude (g = 980.6199 gals.).

LK0444

LK0444.The modeled gravity was interpolated from observed gravity values.

LK0444

LK0444. The following values were computed from the NAD 83(2011) position.

LK0444

LK0444;		North	East	Units	Scale Factor	Converg.
LK0444;SPC CO N	-	489,595.997	1,172,982.385	MT	1.00003286	+1 59 05.5
LK0444;SPC CO N	-	1,606,282.87	3,848,359.71	sFT	1.00003286	+1 59 05.5
LK0444;UTM 13	-	4,537,198.977	716,452.789	MT	1.00017668	+1 41 11.5

LK0444

LK0444! - Elev Factor x Scale Factor = Combined Factor

LK0444!SPC CO N - 0.99983393 x 1.00003286 = 0.99986679

LK0444!UTM 13 - 0.99983393 x 1.00017668 = 1.00001058

LK0444

LK0444_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TGF1645237198(NAD 83)

LK0444

LK0444 SUPERSEDED SURVEY CONTROL

LK0444

LK0444	NAD 83(2007)-	40 57 26.16209(N)	102 25 41.07258(W)	AD(2002.00)	0
LK0444	ELLIP H (02/10/07)	1058.898 (m)		GP(2002.00)	
LK0444	ELLIP H (12/03/02)	1058.902 (m)		GP()	4 2
LK0444	ELLIP H (10/08/96)	1058.931 (m)		GP()	1 1
LK0444	NAD 83(1992)-	40 57 26.16165(N)	102 25 41.07204(W)	AD()	1
LK0444	ELLIP H (07/08/96)	1059.156 (m)		GP()	1 1
LK0444	NAVD 88	1079.09 (m)	3540.3 (f)	LEVELING	3
LK0444	NGVD 29 (02/14/92)	1078.629 (m)	3538.80 (f)	ADJUSTED	1 2

LK0444

LK0444.Superseded values are not recommended for survey control.

LK0444

LK0444.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LK0444.See file [dsdata.pdf](#) to determine how the superseded data were derived.

LK0444

LK0444_MARKER: DZ = AZIMUTH MARK DISK

LK0444_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

LK0444_STAMPING: PAT 1963

LK0444_MARK LOGO: CGS

LK0444_PROJECTION: FLUSH

LK0444_MAGNETIC: O = OTHER; SEE DESCRIPTION

LK0444_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

LK0444+STABILITY: SURFACE MOTION

LK0444_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LK0444+SATELLITE: SATELLITE OBSERVATIONS - March 11, 2004

LK0444

LK0444	HISTORY	- Date	Condition	Report By
LK0444	HISTORY	- 1963	MONUMENTED	CGS
LK0444	HISTORY	- 1986	GOOD	NGS
LK0444	HISTORY	- 19950629	GOOD	NGS

LK0444 HISTORY

LK0444 HISTORY

LK0444 HISTORY

LK0444 HISTORY

LK0444 HISTORY - 20040311 GOOD DREXEL

LK0444

LK0444

STATION DESCRIPTION

LK0444

LK0444'DESCRIBED BY NATIONAL GEODETIC SURVEY 1986

LK0444'3.5 KM (2.2 MI) WEST FROM OVID.

LK0444'3.5 KM (2.15 MI) WEST ALONG US HIGHWAY 138 FROM THE POST OFFICE IN

LK0444'OVID, 18.3 METERS (60 FT) NORTH OF THE HIGHWAY CENTERLINE AND 0.15

LK0444'METER (0.5 FT) SOUTH OF THE EAST-WEST FENCE.

LK0444'THE MARK IS 0.15 METERS E FROM A WITNESS POST

LK0444'THE MARK IS 0.15 M ABOVE THE HIGHWAY.

LK0444

LK0444

STATION RECOVERY (1995)

LK0444

LK0444'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995 (RSC)

LK0444'THE STATION IS LOCATED ABOUT 4.8 MI (7.7 KM) EAST-NORTHEAST OF

LK0444'SEDGWICK, 3.1 MI (5.0 KM) SOUTH OF THE COLORADO-NEBRASKA NORTHERN

LK0444'BORDER AND 2.8 MI (4.5 KM) WEST-SOUTHWEST OF OVID, IN THE SOUTHEAST

LK0444'1/4 OF SECTION 1, T 11 N, R 46 W, AT U. S. HIGHWAY 138 MILEPOST

LK0444'48.47. OWNERSHIP--COLORADO DEPT. OF TRANSPORTATION RIGHT-OF-WAY. TO

LK0444'REACH THE STATION FROM THE POST OFFICE IN OVID, GO WEST ON U. S.

LK0444'HIGHWAY 138 FOR 2.15 MI (3.46 KM) TO THE STATION ON THE RIGHT. THE

LK0444'STATION IS A STANDARD DISK SET IN A CONCRETE POST FLUSH WITH THE

LK0444'GROUND. IT IS 35.9 M (117.8 FT) WEST-SOUTHWEST OF A POWER POLE, 24.2

LK0444'M (79.4 FT) EAST-SOUTHEAST OF A POWER POLE, 18.2 M (59.7 FT)

LK0444'NORTH-NORTHWEST OF THE CENTER LINE OF THE HIGHWAY, 0.5 M (1.6 FT)

LK0444'SOUTH-SOUTHEAST OF A METAL WITNESS POST, 0.3 M (1.0 FT) EAST-SOUTHEAST

LK0444'OF A PLASTIC WITNESS POST, 0.15 M (0.49 FT) SOUTH-SOUTHEAST OF THE

LK0444'RIGHT-OF-WAY FENCE AND ABOUT 0.7 M (2.3 FT) BELOW THE HIGHWAY.

LK0444

LK0444

STATION RECOVERY (2004)

LK0444

LK0444'RECOVERY NOTE BY DREXEL BARRELL AND COMPANY ENG 2004

LK0444'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
KJ0324 *****
KJ0324 FBN          -  This is a Federal Base Network Control Station.
KJ0324 DESIGNATION -  R 57 RESET
KJ0324 PID          -  KJ0324
KJ0324 STATE/COUNTY-  CO/WASHINGTON
KJ0324 COUNTRY      -  US
KJ0324 USGS QUAD    -  LAST CHANCE NW (1973)
KJ0324
KJ0324                      *CURRENT SURVEY CONTROL
KJ0324
KJ0324* NAD 83(2011) POSITION- 39 44 25.11799(N) 103 39 01.66349(W)  ADJUSTED
KJ0324* NAD 83(2011) ELLIP HT- 1484.521 (meters)                (06/27/12)  ADJUSTED
KJ0324* NAD 83(2011) EPOCH   - 2010.00
KJ0324* NAVD 88 ORTHO HEIGHT - 1504.067 (meters)                4934.59 (feet) ADJUSTED
KJ0324
KJ0324 GEOID HEIGHT   -          -19.689 (meters)                GEOID12B
KJ0324 NAD 83(2011) X - -1,159,301.055 (meters)                COMP
KJ0324 NAD 83(2011) Y - -4,773,576.978 (meters)                COMP
KJ0324 NAD 83(2011) Z -  4,056,804.684 (meters)                COMP
KJ0324 LAPLACE CORR   -           -3.17 (seconds)                DEFLEC12B
KJ0324 DYNAMIC HEIGHT -           1502.737 (meters)            4930.23 (feet) COMP
KJ0324 MODELED GRAVITY -           979,688.8 (mgal)                NAVD 88
KJ0324
KJ0324 VERT ORDER     -  SECOND      CLASS 0
KJ0324
KJ0324 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
KJ0324 Standards:
KJ0324      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
KJ0324      Horiz Ellip              SD_N   SD_E   SD_h          (unitless)
KJ0324 -----
KJ0324 NETWORK      0.37   0.76              0.17   0.13   0.39          0.06930971
KJ0324 -----
KJ0324 Click here for local accuracies and other accuracy information.
KJ0324
KJ0324
KJ0324.The horizontal coordinates were established by GPS observations
KJ0324.and adjusted by the National Geodetic Survey in June 2012.
KJ0324
KJ0324.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
KJ0324.been affixed to the stable North American tectonic plate. See
KJ0324.NA2011 for more information.
KJ0324
KJ0324.The horizontal coordinates are valid at the epoch date displayed above
KJ0324.which is a decimal equivalence of Year/Month/Day.
KJ0324
KJ0324.The orthometric height was determined by differential leveling and
KJ0324.adjusted by the NATIONAL GEODETIC SURVEY
KJ0324.in June 1991.
KJ0324

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KJ0324. Significant digits in the geoid height do not necessarily reflect accuracy. KJ0324.GEOID12B height accuracy estimate available [here](#).

KJ0324. [Photographs](#) are available for this station.

KJ0324. The X, Y, and Z were computed from the position and the ellipsoidal ht.

KJ0324. The Laplace correction was computed from DEFLEC12B derived deflections.

KJ0324. The ellipsoidal height was determined by GPS observations and is referenced to NAD 83.

KJ0324. The dynamic height is computed by dividing the NAVD 88 geopotential number by the normal gravity value computed on the Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45 degrees latitude ($g = 980.6199$ gals.).

KJ0324. The modeled gravity was interpolated from observed gravity values.

KJ0324. The following values were computed from the NAD 83(2011) position.

	North	East	Units	Scale Factor	Converg.
KJ0324;SPC CO N	- 351,640.451	1,072,925.591	MT	0.99999627	+1 11 42.2
KJ0324;SPC CO N	- 1,153,673.71	3,520,090.04	sFT	0.99999627	+1 11 42.2
KJ0324;UTM 13	- 4,399,805.581	615,633.322	MT	0.99976462	+0 51 46.3

	Elev Factor	x	Scale Factor	=	Combined Factor
KJ0324!SPC CO N	- 0.99976716	x	0.99999627	=	0.99976343
KJ0324!UTM 13	- 0.99976716	x	0.99976462	=	0.99953183

KJ0324_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SFD1563399805(NAD 83)

SUPERSEDED SURVEY CONTROL

KJ0324	NAD 83(2007)-	39 44 25.11792(N)	103 39 01.66394(W)	AD(2002.00)	0
KJ0324	ELLIP H (02/10/07)	1484.546 (m)		GP(2002.00)	
KJ0324	NAD 83(1992)-	39 44 25.11782(N)	103 39 01.66387(W)	AD()	A
KJ0324	ELLIP H (09/24/02)	1484.552 (m)		GP()	3 1
KJ0324	NAD 83(1992)-	39 44 25.11612(N)	103 39 01.66353(W)	AD()	1
KJ0324	ELLIP H (10/01/01)	1484.544 (m)		GP()	3 2
KJ0324	NAD 83(1986)-	39 44 25.11283(N)	103 39 01.65971(W)	AD()	3
KJ0324	NAD 83(1992)-	39 44 25.11853(N)	103 39 01.66346(W)	AD()	B
KJ0324	ELLIP H (05/26/92)	1484.507 (m)		GP()	4 1
KJ0324	NAVD 88 (09/24/02)	1504.3 (m)	UNKNOWN model used	GPS OBS	
KJ0324	NAVD 88	1504.25 (m)	4935.2 (f)	LEVELING	3
KJ0324	NAVD 88 (12/27/99)	1504.2 (m)	GEOID96 model used	GPS OBS	
KJ0324	NAVD 88	1504.07 (m)	4934.6 (f)	LEVELING	3
KJ0324	NGVD 29 (??/??/92)	1503.307 (m)	4932.10 (f)	ADJ UNCH	2 0
KJ0324	NGVD 29	1503.31 (m)	4932.1 (f)	LEVELING	3

KJ0324. Superseded values are not recommended for survey control.

KJ0324. NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums. See file [dsdata.pdf](#) to determine how the superseded data were derived.

- KJ0324_MARKER: DB = BENCH MARK DISK
- KJ0324_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
- KJ0324_STAMPING: R 57 RESET 1938
- KJ0324_MARK LOGO: CGS
- KJ0324_PROJECTION: RECESSED 3 CENTIMETERS

KJ0324_MAGNETIC: N = NO MAGNETIC MATERIAL
 KJ0324_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 KJ0324+STABILITY: SURFACE MOTION
 KJ0324_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 KJ0324+SATELLITE: SATELLITE OBSERVATIONS - May 07, 2001

KJ0324
 KJ0324 HISTORY - Date Condition Report By
 KJ0324 HISTORY - 1938 MONUMENTED CGS
 KJ0324 HISTORY - 1954 GOOD CGS
 KJ0324 HISTORY - 19910421 GOOD NGS
 KJ0324 HISTORY - 19930331 GOOD CODH
 KJ0324 HISTORY - 19990217 GOOD JRENG
 KJ0324 HISTORY - 20010507 GOOD CODOT

KJ0324

KJ0324 STATION DESCRIPTION

KJ0324

KJ0324'DESCRIBED BY COAST AND GEODETIC SURVEY 1954
 KJ0324'3 MI W FROM LAST CHANCE.
 KJ0324'3.0 MILES WEST ALONG U.S. HIGHWAY 36 FROM ITS INTERSECTION WITH
 KJ0324'STATE HIGHWAY 71 AT LAST CHANCE, 148 FEET NORTHWEST OF THE CENTER
 KJ0324'OF A JUNCTION WITH A ROAD LEADING SOUTH, 100 FEET NORTH OF THE
 KJ0324'CENTER LINE OF THE HIGHWAY, 109 FEET WEST OF THE EXTENDED CENTER
 KJ0324'LINE OF THE ROAD LEADING SOUTH, 94 FEET WEST OF A FENCE CORNER,
 KJ0324'0.5 FOOT NORTH OF A FENCE, 1.5 FEET NORTH OF A WITNESS POST, SET
 KJ0324'IN THE TOP OF A CONCRETE POST WHICH IS 0.4 FOOT BELOW THE TOP OF
 KJ0324'THE GROUND.

KJ0324

KJ0324 STATION RECOVERY (1991)

KJ0324

KJ0324'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1991
 KJ0324'STATION IS LOCATED ABOUT MIDWAY BETWEEN LIMON AND FORT MORGAN, 5 KM
 KJ0324'(3.1 MI) WEST OF LAST CHANCE, 5 KM (3.1 MI) EAST OF THE
 KJ0324'WASHINGTON-ADAMS-ARAPAHOE COUNTIES JUNCTION CORNER, ALONG US HIGHWAY
 KJ0324'36, AT MILE 132.6, IN FENCED RANGE, IN THE SOUTHEAST CORNER OF
 KJ0324'SECTION 33, T 4 S, R 56 W. OWNERSHIP--HOWARD SCHREIBER, LAST CHANCE,
 KJ0324'CO. PHONE IS 303-386-2359.
 KJ0324'TO REACH FROM THE JUNCTION OF US HIGHWAY 36 AND STATE HIGHWAY 71 AT
 KJ0324'LAST CHANCE, GO WEST ON HIGHWAY 36 FOR 3.13 KM (1.94 MI) TO AN
 KJ0324'ELECTRIC SUBSTATION ON THE LEFT. CONTINUE AHEAD FOR 1.69 KM
 KJ0324'(1.05 MI) TO A TRACK ROAD LEFT, A FIELD ENTRANCE AND STATION ON THE
 KJ0324'RIGHT.
 KJ0324'STATION MARK IS SET IN THE TOP OF A 15-CM SQUARE CONCRETE POST 3 CM
 KJ0324'BELOW GROUND. IT IS 33.4 M (109.6 FT) NORTH OF, AND 1.5 M (4.9 FT)
 KJ0324'LOWER THAN THE HIGHWAY CENTER, 35.5 M (116.5 FT) WEST OF THE CENTER OF
 KJ0324'THE FIELD ENTRANCE, 0.2 M (0.7 FT) NORTH OF THE RIGHT-OF-WAY FENCE,
 KJ0324'0.3 M (1.0 FT) NORTH OF A FIBERGLASS WITNESS POST AND 150 M
 KJ0324'(492.1 FT) EAST OF THE TOP OF RISE.

KJ0324'DESCRIBED BY G.R.HEID

KJ0324

KJ0324 STATION RECOVERY (1993)

KJ0324

KJ0324'RECOVERY NOTE BY COLORADO STATE DEPARTMENT OF HIGHWAYS 1993 (KAW)
 KJ0324'RECOVERED AS DESCRIBED.

KJ0324

KJ0324 STATION RECOVERY (1999)

KJ0324

KJ0324'RECOVERY NOTE BY JR ENGINEERING LTD 1999 (TGB)
 KJ0324'RECOVERED AS DESCRIBED.

KJ0324

KJ0324 STATION RECOVERY (2001)

KJ0324

KJ0324'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 2001 (DAS)

KJ0324'RECOVERED AS DESCRIBED BY G.R. HEID IN 1991.

KJ0324'

KJ0324'D.A. STEWART, CDOT.

KJ0324'

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
KJ0353 *****
KJ0353 DESIGNATION -  S 70
KJ0353 PID          -  KJ0353
KJ0353 STATE/COUNTY-  CO/WASHINGTON
KJ0353 COUNTRY      -  US
KJ0353 USGS QUAD    -  WOODLIN SCHOOL (1973)
KJ0353
KJ0353                      *CURRENT SURVEY CONTROL
KJ0353
KJ0353* NAD 83(2011) POSITION- 39 48 46.75317(N) 103 35 34.25794(W) ADJUSTED
KJ0353* NAD 83(2011) ELLIP HT- 1418.901 (meters) (06/27/12) ADJUSTED
KJ0353* NAD 83(2011) EPOCH   - 2010.00
KJ0353* NAVD 88 ORTHO HEIGHT - 1438.709 (meters) 4720.16 (feet) ADJUSTED
KJ0353
KJ0353 GEOID HEIGHT   -      -19.816 (meters) GEOID12B
KJ0353 NAD 83(2011) X - -1,153,275.020 (meters) COMP
KJ0353 NAD 83(2011) Y - -4,769,672.015 (meters) COMP
KJ0353 NAD 83(2011) Z -  4,062,965.722 (meters) COMP
KJ0353 LAPLACE CORR   -      -4.33 (seconds) DEFLEC12B
KJ0353 DYNAMIC HEIGHT -      1437.472 (meters) 4716.11 (feet) COMP
KJ0353 MODELED GRAVITY -      979,715.8 (mgal) NAVD 88
KJ0353
KJ0353 VERT ORDER     -  SECOND CLASS 0
KJ0353
KJ0353 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
KJ0353 Standards:
KJ0353      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
KJ0353      Horiz Ellip              SD_N   SD_E   SD_h      (unitless)
KJ0353 -----
KJ0353 NETWORK      0.83   1.90              0.38   0.28   0.97      -0.03651312
KJ0353 -----
KJ0353 Click here for local accuracies and other accuracy information.
KJ0353
KJ0353
KJ0353.The horizontal coordinates were established by GPS observations
KJ0353.and adjusted by the National Geodetic Survey in June 2012.
KJ0353
KJ0353.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
KJ0353.been affixed to the stable North American tectonic plate. See
KJ0353.NA2011 for more information.
KJ0353
KJ0353.The horizontal coordinates are valid at the epoch date displayed above
KJ0353.which is a decimal equivalence of Year/Month/Day.
KJ0353
KJ0353.The orthometric height was determined by differential leveling and
KJ0353.adjusted by the NATIONAL GEODETIC SURVEY
KJ0353.in June 1991.
KJ0353
KJ0353.Significant digits in the geoid height do not necessarily reflect accuracy.

```

KJ0353.GEOID12B height accuracy estimate available [here](#).

KJ0353

KJ0353.The X, Y, and Z were computed from the position and the ellipsoidal ht.

KJ0353

KJ0353.The Laplace correction was computed from DEFLEC12B derived deflections.

KJ0353

KJ0353.The ellipsoidal height was determined by GPS observations

KJ0353.and is referenced to NAD 83.

KJ0353

KJ0353.The dynamic height is computed by dividing the NAVD 88

KJ0353.geopotential number by the normal gravity value computed on the

KJ0353.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

KJ0353.degrees latitude (g = 980.6199 gals.).

KJ0353

KJ0353.The modeled gravity was interpolated from observed gravity values.

KJ0353

KJ0353. The following values were computed from the NAD 83(2011) position.

KJ0353

KJ0353;		North	East	Units	Scale Factor	Converg.
KJ0353;SPC CO N	-	359,812.399	1,077,689.284	MT	0.99998585	+1 13 56.2
KJ0353;SPC CO N	-	1,180,484.51	3,535,718.93	sFT	0.99998585	+1 13 56.2
KJ0353;UTM 13	-	4,407,948.028	620,443.188	MT	0.99977859	+0 54 03.9

KJ0353

KJ0353! - Elev Factor x Scale Factor = Combined Factor

KJ0353!SPC CO N - 0.99977745 x 0.99998585 = 0.99976330

KJ0353!UTM 13 - 0.99977745 x 0.99977859 = 0.99955609

KJ0353

KJ0353_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SFE2044307948(NAD 83)

KJ0353

KJ0353 SUPERSEDED SURVEY CONTROL

KJ0353

KJ0353	NAD 83(2007)-	39 48 46.75317(N)	103 35 34.25839(W)	AD(2002.00)	0
KJ0353	ELLIP H (02/10/07)	1418.921 (m)		GP(2002.00)	
KJ0353	ELLIP H (12/03/02)	1418.929 (m)		GP()	4 2
KJ0353	NAD 83(1992)-	39 48 46.75350(N)	103 35 34.25792(W)	AD()	1
KJ0353	ELLIP H (12/27/99)	1418.910 (m)		GP()	4 1
KJ0353	NAVD 88	1438.71 (m)	4720.2 (f)	LEVELING	3
KJ0353	NGVD 29 (??/??/92)	1437.981 (m)	4717.78 (f)	ADJ UNCH	2 0

KJ0353

KJ0353.Superseded values are not recommended for survey control.

KJ0353

KJ0353.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

KJ0353.See file [dsdata.pdf](#) to determine how the superseded data were derived.

KJ0353

KJ0353_MARKER: DB = BENCH MARK DISK

KJ0353_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

KJ0353_STAMPING: S 70 1935

KJ0353_MARK LOGO: CGS

KJ0353_MAGNETIC: N = NO MAGNETIC MATERIAL

KJ0353_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

KJ0353+STABILITY: SURFACE MOTION

KJ0353_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

KJ0353+SATELLITE: SATELLITE OBSERVATIONS - February 17, 1999

KJ0353

KJ0353	HISTORY	- Date	Condition	Report By
KJ0353	HISTORY	- 1935	MONUMENTED	CGS
KJ0353	HISTORY	- 1954	GOOD	CGS
KJ0353	HISTORY	- 19990217	GOOD	JRENG

KJ0353

KJ0353

KJ0353

KJ0353

KJ0353

STATION DESCRIPTION

KJ0353

KJ0353'DESCRIBED BY COAST AND GEODETIC SURVEY 1954

KJ0353'5.1 MI N FROM LAST CHANCE.

KJ0353'5.1 MILES NORTH ALONG STATE HIGHWAY 71 FROM ITS INTERSECTION WITH
KJ0353'U.S. HIGHWAY 36 AT LAST CHANCE, 35 FEET NORTH OF THE EXTENDED
KJ0353'CENTER LINE OF A GRADED DIRT ROAD LEADING WEST, 46 FEET EAST OF THE
KJ0353'CENTER LINE OF THE HIGHWAY, 5.5 FEET NORTHWEST OF A TELEPHONE POLE,
KJ0353'2 FEET WEST OF A FENCE, 2 FEET SOUTH OF A WITNESS POST, SET IN THE TOP
KJ0353'OF A CONCRETE POST WHICH PROJECTS 0.6 FOOT ABOVE THE GROUND.

KJ0353

KJ0353 STATION RECOVERY (1999)

KJ0353

KJ0353'RECOVERY NOTE BY JR ENGINEERING LTD 1999 (TGB)

KJ0353'RECOVERED AS DESCRIBED.

*** retrieval complete.

Elapsed Time = 00:00:04

The NGS Data Sheet

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

```

PROGRAM = datasheet95, VERSION = 8.12.5.3
1      National Geodetic Survey,  Retrieval Date = AUGUST  7, 2019
LK0120 *****
LK0120 DESIGNATION -  U 59
LK0120 PID          -  LK0120
LK0120 STATE/COUNTY-  CO/YUMA
LK0120 COUNTRY      -  US
LK0120 USGS QUAD    -  YUMA NORTH (1972)
LK0120
LK0120                      *CURRENT SURVEY CONTROL
LK0120
LK0120 * NAD 83(2011) POSITION- 40 09 42.04598(N) 102 43 05.43227(W) NO CHECK
LK0120 * NAD 83(2011) ELLIP HT- 1227.176 (meters) (06/27/12) NO CHECK
LK0120 * NAD 83(2011) EPOCH   - 2010.00
LK0120 * NAVD 88 ORTHO HEIGHT - 1248.305 (meters) 4095.48 (feet) ADJUSTED
LK0120
LK0120 GEOID HEIGHT   -      -21.142 (meters) GEOID12B
LK0120 NAD 83(2011) X - -1,074,818.973 (meters) COMP
LK0120 NAD 83(2011) Y - -4,762,303.365 (meters) COMP
LK0120 NAD 83(2011) Z -  4,092,512.971 (meters) COMP
LK0120 LAPLACE CORR   -      -2.65 (seconds) DEFLEC12B
LK0120 DYNAMIC HEIGHT -      1247.322 (meters) 4092.26 (feet) COMP
LK0120 MODELED GRAVITY -      979,795.2 (mgal) NAVD 88
LK0120
LK0120 VERT ORDER     -  SECOND CLASS 0
LK0120
LK0120 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
LK0120 Standards:
LK0120      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
LK0120      Horiz  Ellip              SD_N  SD_E  SD_h      (unitless)
LK0120 -----
LK0120 NETWORK    2.21  2.12              1.06  0.64  1.08      0.04000500
LK0120 -----
LK0120 Click here for local accuracies and other accuracy information.
LK0120
LK0120
LK0120.The horizontal coordinates were established by GPS observations
LK0120.and adjusted by the National Geodetic Survey in June 2012.
LK0120
LK0120.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
LK0120.been affixed to the stable North American tectonic plate. See
LK0120.NA2011 for more information.
LK0120
LK0120.The horizontal coordinates are valid at the epoch date displayed above
LK0120.which is a decimal equivalence of Year/Month/Day.
LK0120
LK0120.No horizontal observational check was made to the station.
LK0120.
LK0120.The orthometric height was determined by differential leveling and
LK0120.adjusted by the NATIONAL GEODETIC SURVEY
LK0120.in June 1991.

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LK0120

LK0120.Significant digits in the geoid height do not necessarily reflect accuracy.
LK0120.GEOID12B height accuracy estimate available [here](#).

LK0120

LK0120.[Photographs](#) are available for this station.

LK0120

LK0120.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LK0120

LK0120.The Laplace correction was computed from DEFLEC12B derived deflections.

LK0120

LK0120.The ellipsoidal height was determined by GPS observations

LK0120.and is referenced to NAD 83.

LK0120

LK0120.The dynamic height is computed by dividing the NAVD 88

LK0120.geopotential number by the normal gravity value computed on the

LK0120.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

LK0120.degrees latitude (g = 980.6199 gals.).

LK0120

LK0120.The modeled gravity was interpolated from observed gravity values.

LK0120

LK0120. The following values were computed from the NAD 83(2011) position.

LK0120

LK0120;		North	East	Units	Scale	Factor	Converg.
LK0120;SPC CO N	-	400,488.896	1,151,342.524	MT	0.99995805	+1	47 50.7
LK0120;SPC CO N	-	1,313,937.32	3,777,362.93	sFT	0.99995805	+1	47 50.7
LK0120;UTM 13	-	4,448,198.660	694,324.432	MT	1.00006488	+1	28 19.6

LK0120

LK0120!
- Elev Factor x Scale Factor = Combined Factor

LK0120!SPC CO N - 0.99980752 x 0.99995805 = 0.99976558

LK0120!UTM 13 - 0.99980752 x 1.00006488 = 0.99987239

LK0120

LK0120_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFE9432448198(NAD 83)

LK0120

LK0120 SUPERSEDED SURVEY CONTROL

LK0120

LK0120	NAD 83(2007)-	40 09 42.04590(N)	102 43 05.43271(W)	AD(2002.00)	0
LK0120	ELLIP H (02/10/07)	1227.205 (m)		GP(2002.00)	
LK0120	ELLIP H (10/21/02)	1227.206 (m)		GP()	5 1
LK0120	NAD 83(1992)-	40 09 42.04577(N)	102 43 05.43272(W)	AD()	1
LK0120	ELLIP H (06/30/00)	1227.203 (m)		GP()	1 1
LK0120	NAVD 88	1248.30 (m)	4095.5 (f)	LEVELING	3
LK0120	NGVD 29 (??/??/92)	1247.758 (m)	4093.69 (f)	ADJ UNCH	2 0

LK0120

LK0120.Superseded values are not recommended for survey control.

LK0120

LK0120.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LK0120.See file [dsdata.pdf](#) to determine how the superseded data were derived.

LK0120

LK0120_MARKER: DB = BENCH MARK DISK

LK0120_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

LK0120_STAMPING: U 59 1935

LK0120_MARK LOGO: CGS

LK0120_MAGNETIC: O = OTHER; SEE DESCRIPTION

LK0120_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

LK0120+STABILITY: SURFACE MOTION

LK0120_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LK0120+SATELLITE: SATELLITE OBSERVATIONS - April 13, 1999

LK0120

LK0120 HISTORY - Date Condition Report By

LK0120 HISTORY - 1935 MONUMENTED CGS

LK0120 HISTORY - 1942 GOOD CGS
LK0120 HISTORY - 19990413 GOOD MSAM

LK0120

LK0120

STATION DESCRIPTION

LK0120

LK0120'DESCRIBED BY COAST AND GEODETIC SURVEY 1942

LK0120'3 MI N FROM YUMA.

LK0120'3.0 MILES NORTH ALONG STATE HIGHWAY 59 FROM THE INTERSECTION

LK0120'OF STATE HIGHWAY 54 AT YUMA, YUMA COUNTY, AT A ROAD INTERSECTION,

LK0120'66 FEET EAST OF THE CENTERLINE OF THE HIGHWAY, 32 FEET SOUTH OF THE

LK0120'CENTERLINE OF THE ROAD, 35 FEET EAST OF A FENCE CORNER, AND 1-1/2

LK0120'FEET NORTH OF THE FENCE. A STANDARD DISK, STAMPED U 59 1935 AND

LK0120'SET IN THE TOP OF A CONCRETE POST.

LK0120

LK0120

STATION RECOVERY (1999)

LK0120

LK0120'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 1999 (KCH)

LK0120'THE STATION IS LOCATED ABOUT 3 KM (1.85 MI) NORTH OF YUMA AND 42 KM

LK0120'(26.10 MI) EAST OF AKRON, COLORADO. IT IS EAST OF STATE HIGHWAY 59 AT

LK0120'MILE POST 109.9, AND SOUTH OF COUNTY ROAD 41, IN THE NORTHWEST QUARTER

LK0120'OF SECTION 11, T 2 N, R 48 W.

LK0120'TO REACH THE STATION FROM THE INTERSECTION OF US HIGHWAY 34 (8TH

LK0120'AVENUE) AND STATE HIGHWAY 59 (DETROIT STREET) IN YUMA, GO NORTH ON

LK0120'STATE HIGHWAY 59 FOR 3 MI (4.8 KM) TO THE STATION ON THE RIGHT

LK0120'THE MARK IS A COAST AND GEODETIC SURVEY BENCHMARK DISK, SET IN THE TOP

LK0120'CENTER OF A 25 CM SQUARE CONCRETE POST, PROJECTING 10 CM ABOVE THE

LK0120'GROUND. IT IS 73 FT (22.3 M) EAST OF STATE HIGHWAY 59, 33 FT (10.1 M)

LK0120'SOUTH OF COUNTY ROAD 41 AND 2 FT (0.6 M) SOUTH OF A FIBERGLASS WITNESS

LK0120'POST.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

```

PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
HK0057 *****
HK0057 DESIGNATION - 5544
HK0057 PID - HK0057
HK0057 STATE/COUNTY- CO/LAS ANIMAS
HK0057 COUNTRY - US
HK0057 USGS QUAD - TYRONE (1993)
HK0057
HK0057 *CURRENT SURVEY CONTROL
HK0057
HK0057* NAD 83(2011) POSITION- 37 27 34.02925(N) 104 12 22.06707(W) ADJUSTED
HK0057* NAD 83(2011) ELLIP HT- 1671.982 (meters) (06/27/12) ADJUSTED
HK0057* NAD 83(2011) EPOCH - 2010.00
HK0057* NAVD 88 ORTHO HEIGHT - 1691.817 (meters) 5550.57 (feet) ADJUSTED
HK0057
HK0057 GEOID HEIGHT - -19.840 (meters) GEOID12B
HK0057 NAD 83(2011) X - -1,244,349.679 (meters) COMP
HK0057 NAD 83(2011) Y - -4,915,410.701 (meters) COMP
HK0057 NAD 83(2011) Z - 3,859,009.761 (meters) COMP
HK0057 LAPLACE CORR - -3.01 (seconds) DEFLEC12B
HK0057 DYNAMIC HEIGHT - 1689.875 (meters) 5544.20 (feet) COMP
HK0057 MODELED GRAVITY - 979,422.9 (mgal) NAVD 88
HK0057
HK0057 VERT ORDER - SECOND CLASS 0
HK0057
HK0057 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HK0057 Standards:
HK0057 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
HK0057 Horiz Ellip SD_N SD_E SD_h (unitless)
HK0057 -----
HK0057 NETWORK 0.97 1.69 0.43 0.36 0.86 -0.00044171
HK0057 -----
HK0057 Click here for local accuracies and other accuracy information.
HK0057
HK0057
HK0057.The horizontal coordinates were established by GPS observations
HK0057.and adjusted by the National Geodetic Survey in June 2012.
HK0057
HK0057.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HK0057.been affixed to the stable North American tectonic plate. See
HK0057.NA2011 for more information.
HK0057
HK0057.The horizontal coordinates are valid at the epoch date displayed above
HK0057.which is a decimal equivalence of Year/Month/Day.
HK0057
HK0057.The orthometric height was determined by differential leveling and
HK0057.adjusted by the NATIONAL GEODETIC SURVEY
HK0057.in June 1991.
HK0057
HK0057.Significant digits in the geoid height do not necessarily reflect accuracy.

```

HK0057.GEOID12B height accuracy estimate available [here](#).

HK0057

HK0057.The X, Y, and Z were computed from the position and the ellipsoidal ht.

HK0057

HK0057.The Laplace correction was computed from DEFLEC12B derived deflections.

HK0057

HK0057.The ellipsoidal height was determined by GPS observations

HK0057.and is referenced to NAD 83.

HK0057

HK0057.The dynamic height is computed by dividing the NAVD 88

HK0057.geopotential number by the normal gravity value computed on the

HK0057.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

HK0057.degrees latitude (g = 980.6199 gals.).

HK0057

HK0057.The modeled gravity was interpolated from observed gravity values.

HK0057

HK0057. The following values were computed from the NAD 83(2011) position.

HK0057

HK0057;		North	East	Units	Scale Factor	Converg.
HK0057;SPC CO S	-	393,579.626	1,028,867.241	MT	0.99996666	+0 47 37.1
HK0057;SPC CO S	-	1,291,269.16	3,375,541.94	sFT	0.99996666	+0 47 37.1
HK0057;UTM 13	-	4,146,138.754	570,208.767	MT	0.99966072	+0 28 58.3

HK0057

HK0057! Elev Factor x Scale Factor = Combined Factor

HK0057!SPC CO S - 0.99973769 x 0.99996666 = 0.99970436

HK0057!UTM 13 - 0.99973769 x 0.99966072 = 0.99939850

HK0057

HK0057_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SEB7020846138(NAD 83)

HK0057

HK0057 SUPERSEDED SURVEY CONTROL

HK0057

HK0057	NAD 83(2007)-	37 27 34.02927(N)	104 12 22.06747(W)	AD(2002.00)	0
HK0057	ELLIP H (02/10/07)	1671.999 (m)		GP(2002.00)	
HK0057	ELLIP H (12/03/02)	1672.026 (m)		GP()	4 2
HK0057	NAD 83(1992)-	37 27 34.02924(N)	104 12 22.06665(W)	AD()	1
HK0057	ELLIP H (04/19/01)	1672.033 (m)		GP()	4 2
HK0057	NAVD 88	1691.82 (m)	5550.6 (f)	LEVELING	3
HK0057	NGVD 29 (??/??/92)	1690.922 (m)	5547.63 (f)	ADJ UNCH	2 0

HK0057

HK0057.Superseded values are not recommended for survey control.

HK0057

HK0057.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

HK0057.See file [dsdata.pdf](#) to determine how the superseded data were derived.

HK0057

HK0057_MARKER: DD = SURVEY DISK

HK0057_SETTING: 17 = SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND

HK0057_STAMPING: 5544

HK0057_MARK LOGO: USGS

HK0057_MAGNETIC: N = NO MAGNETIC MATERIAL

HK0057_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

HK0057_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

HK0057+SATELLITE: SATELLITE OBSERVATIONS - May 18, 1999

HK0057

HK0057	HISTORY	- Date	Condition	Report By
HK0057	HISTORY	- 1911	MONUMENTED	USGS
HK0057	HISTORY	- 1934	GOOD	CGS
HK0057	HISTORY	- 1985	GOOD	DOD
HK0057	HISTORY	- 1985	GOOD	DOD
HK0057	HISTORY	- 19990518	GOOD	NGS

HK0057

HK0057 STATION DESCRIPTION

HK0057

HK0057'DESCRIBED BY COAST AND GEODETIC SURVEY 1934

HK0057'0.5 MI NE FROM TYRONE.

HK0057'ABOUT 0.5 MILE NORTHEAST ALONG THE ATCHISON, TOPEKA AND SANTA
HK0057'FE RAILWAY FROM THE STATION AT TYRONE, LAS ANIMAS COUNTY, ABOUT
HK0057'4 POLES NORTHEAST OF A SWITCH AND SIGNALS, ABOUT 101 FEET SOUTHEAST
HK0057'OF THE CENTER LINE OF THE TRACK, 42 FEET NORTHWEST OF THE CENTER
HK0057'LINE OF A HIGHWAY, AND 3 FEET SOUTHWEST OF A SANTA FE TRAIL
HK0057'MONUMENT. A UNITED STATES GEOLOGICAL SURVEY STANDARD CAP, STAMPED
HK0057'5544 AND RIVETED ON THE TOP OF A 3-1/2-INCH IRON PIPE EMBEDDED
HK0057'IN CONCRETE.

HK0057

HK0057

STATION RECOVERY (1985)

HK0057

HK0057'RECOVERY NOTE BY US DEPARTMENT OF DEFENSE 1985

HK0057'A NEW DESC: NOTE THAT THE STAMPING ON THE DISK DOES NOT MATCH THE
HK0057'DESIGNATION DUE TO RESTAMPING OF THE DISK. ABOUT 0.8 KM (0.5 MI)
HK0057'NORTHEAST ALONG THE ATCHISON TOPEKA , AND SANTA FE RAILWAY FROM THE
HK0057'STATION AT TYRONE, LAS ANIMAS COUNTY, 30.8 M (101 FT) SOUTHEAST OF
HK0057'THE CENTER OF THE TRACK, 8.2 M (27 FT) NORTHWEST OF THE CENTER OF A
HK0057'DIRT ROAD , 4.3 M (14 FT) SOUTH OF A GRANITE SANTE FE TRAIL MARKER,
HK0057'0.3 M (1 FT) EAST OF A FENCE. THE DISK PROJECTS ABOUT 48 CM ABOVE THE
HK0057'GROUND, SET IN A PIPE WHICH HAS A SQUARE CONCRETE MONUMENT
HK0057'SURROUNDING IT LOWER DOWN.

HK0057

HK0057

STATION RECOVERY (1985)

HK0057

HK0057'RECOVERY NOTE BY US DEPARTMENT OF DEFENSE 1985

HK0057'NOTE: THAT THE STAMPING ON THE DISK NOT MATCH THE DESIGNATION DUE TO
HK0057'RESTAMPING OF THE DISK. ABOUT 0.8 KM (0.5 MI) NORTHEAST ALONG THE
HK0057'ATCHISON TOPEKA, AND SANTA FE RAILWAY . FROM THE STATION AT TYRONE,
HK0057'LAS ANIMAS COUNTY, 30.8 M (101 FT) SOUTHEAST OF THE CENTER OF THE
HK0057'TRACK, 8.2 M (27 FT) NORTHWEST OF THE CENTER OF A DIRT ROAD, 4.3 M
HK0057'(14 FT) SOUTH OF A GRANITE SANTE FE TRAIL MARKER, 0.3 M (1 FT) EAST
HK0057'OF A FENCE. THE DISK PROJECTS ABOUT 48 CM ABOVE THE GROUND. SET IN A
HK0057'PIPE WHICH HAS A SQUARE CONCRETE MONUMENT SURROUNDING IT LOWER DOWN.

HK0057

HK0057

STATION RECOVERY (1999)

HK0057

HK0057'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999

HK0057'DESCRIBED BY NGS 1999 (RSC)

HK0057'THE STATION IS LOCATED ABOUT 8 MI (12.9 KM) SOUTHWEST OF THATCHER, 6.3
HK0057'MI(10.1 KM) NORTH-NORTHEAST OF MODEL AND 0.4 MI (0.6 KM)

HK0057'NORTH-NORTHEAST

HK0057'OF TYRONE, IN THE SOUTHWEST 1/4 OF SECTION 2, T 30 S, R 61 W, AT U.

HK0057'S. HIGHWAY

HK0057'350 MILEPOST 20.38. OWNERSHIP--

HK0057'

HK0057'TO REACH THE STATION FROM THE INTERSECTION OF U. S. HIGHWAY 350 AND
HK0057'COUNTY ROAD 64.0 JUST NORTH OF TYRONE, GO NORTH ON U. S. HIGHWAY 350
HK0057'FOR

HK0057'0.4 MI (0.6 KM) TO A SIDE ROAD LEFT, WHERE A DOUBLE POWER POLE LINE
HK0057'CROSSES

HK0057'THE HIGHWAY. TURN LEFT, WEST, THAN NORTH-NORTHEAST ALONG THE TRACK
HK0057'ROAD ON THE EASTSIDE OF THE RAILROAD TRACKS FOR 0.15 MI (0.24 KM) TO
HK0057'THE

HK0057'STATION ON THE EASTSIDE OF THE EASTERN RIGHT-OF-WAY FENCE

HK0057'

HK0057'THE MARK IS A PIPE DISK SET INTO THE TOP OF A IRON PIPE THAT IS SET

HK0057' INTO THE
HK0057' TOP OF A SQUARE CONCRETE POST, THE TOP OF THE PIPE IS PROJECTING 40 CM
HK0057' ABOVE THE GROUND. NOTE THAT THE STAMPING DOES NOT MATCH MARK
HK0057' DESIGNATION BECAUSE IT HAS BEEN RE-STAMPED. IT IS 30.8 M (101.0 FT)
HK0057' SOUTHEAST FROM THE CENTER OF THE TRACK, 10.0 M (32.8 FT) EAST FROM
HK0057' POWERPOLE NUMBER 16G, 8.2 M (26.9 FT) NORTHWEST FROM THE CENTER OF THE
HK0057' OLD HIGHWAY, 4.3 M (14.1 FT) SOUTH FROM A GRANITE SANTA FE TRAIL MARKER
HK0057' AND
HK0057' 1.25 M (4.10 FT) FROM A WITNESS POST.
HK0057'
HK0057'

*** retrieval complete.
Elapsed Time = 00:00:04

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
HK0048 *****
HK0048 DESIGNATION - 5629
HK0048 PID - HK0048
HK0048 STATE/COUNTY- CO/LAS ANIMAS
HK0048 COUNTRY - US
HK0048 USGS QUAD - EARL (1970)
HK0048
HK0048 *CURRENT SURVEY CONTROL
HK0048
HK0048 * NAD 83(2011) POSITION- 37 21 37.51514(N) 104 15 07.26287(W) ADJUSTED
HK0048 * NAD 83(2011) ELLIP HT- 1697.899 (meters) (06/27/12) ADJUSTED
HK0048 * NAD 83(2011) EPOCH - 2010.00
HK0048 * NAVD 88 ORTHO HEIGHT - 1717.630 (meters) 5635.26 (feet) ADJUSTED
HK0048
HK0048 GEOID HEIGHT - -19.717 (meters) GEOID12B
HK0048 NAD 83(2011) X - -1,249,935.343 (meters) COMP
HK0048 NAD 83(2011) Y - -4,920,905.914 (meters) COMP
HK0048 NAD 83(2011) Z - 3,850,292.888 (meters) COMP
HK0048 LAPLACE CORR - -4.20 (seconds) DEFLEC12B
HK0048 DYNAMIC HEIGHT - 1715.616 (meters) 5628.65 (feet) COMP
HK0048 MODELED GRAVITY - 979,397.2 (mgal) NAVD 88
HK0048
HK0048 VERT ORDER - SECOND CLASS 0
HK0048
HK0048 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HK0048 Standards:
HK0048 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
HK0048 Horiz Ellip SD_N SD_E SD_h (unitless)
HK0048 -----
HK0048 NETWORK 0.85 1.39 0.37 0.32 0.71 0.02805693
HK0048 -----
HK0048 Click here for local accuracies and other accuracy information.
HK0048
HK0048
HK0048 .The horizontal coordinates were established by GPS observations
HK0048 .and adjusted by the National Geodetic Survey in June 2012.
HK0048
HK0048 .NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HK0048 .been affixed to the stable North American tectonic plate. See
HK0048 .NA2011 for more information.
HK0048
HK0048 .The horizontal coordinates are valid at the epoch date displayed above
HK0048 .which is a decimal equivalence of Year/Month/Day.
HK0048
HK0048 .The orthometric height was determined by differential leveling and
HK0048 .adjusted by the NATIONAL GEODETIC SURVEY
HK0048 .in June 1991.
HK0048
HK0048 .Significant digits in the geoid height do not necessarily reflect accuracy.

```

HK0048.GEOID12B height accuracy estimate available [here](#).

HK0048

HK0048.[Photographs](#) are available for this station.

HK0048

HK0048.The X, Y, and Z were computed from the position and the ellipsoidal ht.

HK0048

HK0048.The Laplace correction was computed from DEFLEC12B derived deflections.

HK0048

HK0048.The ellipsoidal height was determined by GPS observations

HK0048.and is referenced to NAD 83.

HK0048

HK0048.The dynamic height is computed by dividing the NAVD 88

HK0048.geopotential number by the normal gravity value computed on the

HK0048.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

HK0048.degrees latitude (g = 980.6199 gals.).

HK0048

HK0048.The modeled gravity was interpolated from observed gravity values.

HK0048

HK0048. The following values were computed from the NAD 83(2011) position.

HK0048

HK0048;		North	East	Units	Scale Factor	Converg.
HK0048;SPC CO S	-	382,534.606	1,024,954.752	MT	0.99997936	+0 45 55.7
HK0048;SPC CO S	-	1,255,032.29	3,362,705.72	sFT	0.99997936	+0 45 55.7
HK0048;UTM 13	-	4,135,118.623	566,237.601	MT	0.99965404	+0 27 14.1
HK0048!	-	Elev Factor	x	Scale Factor	=	Combined Factor
HK0048!SPC CO S	-	0.99973363	x	0.99997936	=	0.99971299
HK0048!UTM 13	-	0.99973363	x	0.99965404	=	0.99938776

HK0048

HK0048_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SEB6623735118(NAD 83)

HK0048

HK0048

SUPERSEDED SURVEY CONTROL

HK0048

HK0048	NAD 83(2007)-	37 21 37.51509(N)	104 15 07.26325(W)	AD(2002.00)	0
HK0048	ELLIP H (02/10/07)	1697.924 (m)		GP(2002.00)	
HK0048	ELLIP H (12/03/02)	1697.944 (m)		GP()	4 2
HK0048	NAD 83(1992)-	37 21 37.51515(N)	104 15 07.26240(W)	AD()	1
HK0048	ELLIP H (04/19/01)	1697.957 (m)		GP()	4 2
HK0048	NAVD 88	1717.63 (m)	5635.3	(f) LEVELING	3
HK0048	NGVD 29 (??/??/92)	1716.705 (m)	5632.22	(f) ADJ UNCH	2 0

HK0048

HK0048.Superseded values are not recommended for survey control.

HK0048

HK0048.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

HK0048.See file [dsdata.pdf](#) to determine how the superseded data were derived.

HK0048

HK0048_MARKER: DB = BENCH MARK DISK

HK0048_SETTING: 17 = SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND

HK0048_STAMPING: 5629

HK0048_MARK LOGO: USGS

HK0048_MAGNETIC: N = NO MAGNETIC MATERIAL

HK0048_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

HK0048_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

HK0048+SATELLITE: SATELLITE OBSERVATIONS - January 04, 2011

HK0048

HK0048	HISTORY	-	Date	Condition	Report By
HK0048	HISTORY	-	1911	MONUMENTED	USGS
HK0048	HISTORY	-	1934	GOOD	CGS
HK0048	HISTORY	-	19990520	GOOD	NGS
HK0048	HISTORY	-	20110104	GOOD	GEOCAC

HK0048

HK0048

STATION DESCRIPTION

HK0048

HK0048'DESCRIBED BY COAST AND GEODETIC SURVEY 1934

HK0048'1 MI SW FROM MODEL.

HK0048'ABOUT 1.0 MILE SOUTHWEST ALONG THE ATCHISON, TOPEKA AND SANTA

HK0048'FE RAILWAY FROM THE STATION AT MODEL, LAS ANIMAS COUNTY, 1 POLE

HK0048'NORTHEAST OF MILEPOST 616, ABOUT 100 FEET SOUTHEAST OF THE CENTER

HK0048'LINE OF THE TRACK, 32 FEET SOUTHEAST OF A POLE, AND 1 FOOT

HK0048'SOUTHEAST OF A FENCE. A UNITED STATES GEOLOGICAL SURVEY STANDARD

HK0048'CAP, STAMPED 5629 AND RIVETED ON THE TOP OF A 3-1/2-INCH IRON

HK0048'PIPE EMBEDDED IN CONCRETE.

HK0048

HK0048

STATION RECOVERY (1999)

HK0048

HK0048'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999

HK0048'DESCRIBED BY NGS 1999 (RSC)

HK0048'THE STATION IS LOCATED ABOUT 19.5 MI (31.4 KM) NORTHEAST OF TRINIDAD,

HK0048'7.1

HK0048'MI(11.4 KM) SOUTHWEST OF TYRONE AND 1 MI (1.6 KM) SOUTHWEST OF MODEL,

HK0048'IN

HK0048'THE NORTHEAST 1/4 OF SECTION 8, T 31 S, R 61 W, AT U. S. HIGHWAY 350

HK0048'MILEPOST

HK0048'12.9. OWNERSHIP--COLORADO DEPT. OF TRANSPORTATION RIGHT-OF-WAY

HK0048'

HK0048'TO REACH THE STATION FROM THE MODEL MERCANTILE IN THE TOWN OF MODEL

HK0048'ON U. S. HIGHWAY 350, GO SOUTHWEST ON U. S. HIGHWAY 350 FOR 0.95

HK0048'MI(1.53 KM)

HK0048'TO THE STATION ON THE RIGHT

HK0048'

HK0048'THE MARK IS A PIPE DISK SET INTO THE TOP OF AN IRON PIPE WHICH IS

HK0048'SURROUNDED BY A SQUARE 30 CM CONCRETE POST, THE TOP OF THE PIPE IS 40

HK0048'CM

HK0048'ABOVE THE GROUND. IT IS 66.7 M (218.8 FT) NORTHEAST FROM RAILROAD

HK0048'MILEPOST

HK0048'616, 29.9 M (98.1 FT) EAST-SOUTHEAST FROM THE NEAR RAIL, 9.5 M (31.2

HK0048'FT)

HK0048'EAST-SOUTHEAST FROM A TELEPHONE POLE NUMBER 25G, 9.5 M (31.2 FT)

HK0048'WEST-NORTHWEST FROM THE CENTER LINE OF THE HIGHWAY, 1.0 M (3.3 FT)

HK0048'NORTH-NORTHEAST FROM A WITNESS POST, 0.4 M (1.3 FT) SOUTHWEST FROM A

HK0048'WITNESS POST AND ABOUT 0.3 M (1.0 FT) ABOVE THE HIGHWAY.

HK0048'

HK0048'

HK0048

HK0048

STATION RECOVERY (2011)

HK0048

HK0048'RECOVERY NOTE BY GEOCACHING 2011 (MFM)

HK0048'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
HJ0225 *****
HJ0225 CBN          -  This is a Cooperative Base Network Control Station.
HJ0225 DESIGNATION -  D 435
HJ0225 PID          -  HJ0225
HJ0225 STATE/COUNTY-  CO/BACA
HJ0225 COUNTRY     -  US
HJ0225 USGS QUAD   -  CAMPO (1978)
HJ0225
HJ0225                      *CURRENT SURVEY CONTROL
HJ0225
HJ0225* NAD 83(2011) POSITION- 37 04 48.00145(N) 102 34 44.34192(W)  ADJUSTED
HJ0225* NAD 83(2011) ELLIP HT- 1293.852 (meters)          (06/27/12)  ADJUSTED
HJ0225* NAD 83(2011) EPOCH   - 2010.00
HJ0225* NAVD 88 ORTHO HEIGHT - 1317.339 (meters)          4321.97 (feet) ADJUSTED
HJ0225
HJ0225 GEOID HEIGHT   -          -23.470 (meters)          GEOID12B
HJ0225 NAD 83(2011) X - -1,109,763.403 (meters)          COMP
HJ0225 NAD 83(2011) Y - -4,973,364.280 (meters)          COMP
HJ0225 NAD 83(2011) Z -   3,825,260.068 (meters)          COMP
HJ0225 LAPLACE CORR   -           -4.60 (seconds)          DEFLEC12B
HJ0225 DYNAMIC HEIGHT -           1315.907 (meters)          4317.27 (feet) COMP
HJ0225 MODELED GRAVITY -           979,498.2 (mgal)          NAVD 88
HJ0225
HJ0225 VERT ORDER     -   FIRST      CLASS II
HJ0225
HJ0225 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HJ0225 Standards:
HJ0225      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
HJ0225      Horiz Ellip              SD_N   SD_E   SD_h          (unitless)
HJ0225 -----
HJ0225 NETWORK      2.37   5.68              0.79   1.07   2.90          0.35758414
HJ0225 -----
HJ0225 Click here for local accuracies and other accuracy information.
HJ0225
HJ0225
HJ0225.The horizontal coordinates were established by GPS observations
HJ0225.and adjusted by the National Geodetic Survey in June 2012.
HJ0225
HJ0225.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HJ0225.been affixed to the stable North American tectonic plate. See
HJ0225.NA2011 for more information.
HJ0225
HJ0225.The horizontal coordinates are valid at the epoch date displayed above
HJ0225.which is a decimal equivalence of Year/Month/Day.
HJ0225
HJ0225.The orthometric height was determined by differential leveling and
HJ0225.adjusted by the NATIONAL GEODETIC SURVEY
HJ0225.in June 1991.
HJ0225

```

HJ0225.Significant digits in the geoid height do not necessarily reflect accuracy.
 HJ0225.GEOID12B height accuracy estimate available [here](#).
 HJ0225
 HJ0225.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 HJ0225
 HJ0225.The Laplace correction was computed from DEFLEC12B derived deflections.
 HJ0225
 HJ0225.The ellipsoidal height was determined by GPS observations
 HJ0225.and is referenced to NAD 83.
 HJ0225
 HJ0225.The dynamic height is computed by dividing the NAVD 88
 HJ0225.geopotential number by the normal gravity value computed on the
 HJ0225.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 HJ0225.degrees latitude (g = 980.6199 gals.).
 HJ0225
 HJ0225.The modeled gravity was interpolated from observed gravity values.
 HJ0225
 HJ0225. The following values were computed from the NAD 83(2011) position.
 HJ0225
 HJ0225;

	North	East	Units	Scale Factor	Converg.
HJ0225;SPC CO S	- 354,735.235	1,174,099.525	MT	1.00003137	+1 47 30.1
HJ0225;SPC CO S	- 1,163,827.18	3,852,024.86	sFT	1.00003137	+1 47 30.1
HJ0225;UTM 13	- 4,106,489.408	715,204.245	MT	1.00017056	+1 27 36.9

 HJ0225

	Elev Factor	x	Scale Factor	=	Combined Factor
HJ0225!SPC CO S	- 0.99979700	x	1.00003137	=	0.99982836
HJ0225!UTM 13	- 0.99979700	x	1.00017056	=	0.99996752

 HJ0225
 HJ0225_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGB1520406489(NAD 83)
 HJ0225

SUPERSEDED SURVEY CONTROL					
HJ0225	NAD 83(2007)-	37 04 48.00137(N)	102 34 44.34168(W)	AD(2002.00)	0
HJ0225	ELLIP H (02/10/07)	1293.905 (m)		GP(2002.00)	
HJ0225	ELLIP H (10/21/02)	1293.880 (m)		GP()	4 2
HJ0225	NAD 83(1986)-	37 04 47.99899(N)	102 34 44.32928(W)	AD()	3
HJ0225	NAD 83(1992)-	37 04 48.00118(N)	102 34 44.34188(W)	AD()	B
HJ0225	ELLIP H (05/26/92)	1293.891 (m)		GP()	4 1
HJ0225	NAVD 88	1317.34 (m)	4322.0	(f) LEVELING	3
HJ0225	NGVD 29	1317.00 (m)	4320.9	(f) LEVELING	3

 HJ0225
 HJ0225.Superseded values are not recommended for survey control.
 HJ0225
 HJ0225.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 HJ0225.See file [dsdata.pdf](#) to determine how the superseded data were derived.
 HJ0225
 HJ0225_MARKER: I = METAL ROD
 HJ0225_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
 HJ0225_STAMPING: D 435 1985
 HJ0225_MARK LOGO: NGS
 HJ0225_PROJECTION: FLUSH
 HJ0225_MAGNETIC: N = NO MAGNETIC MATERIAL
 HJ0225_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
 HJ0225+STABILITY: POSITION/ELEVATION WELL
 HJ0225_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 HJ0225+SATELLITE: SATELLITE OBSERVATIONS - February 07, 1994
 HJ0225_ROD/PIPE-DEPTH: 5.8 meters
 HJ0225

HJ0225	HISTORY	- Date	Condition	Report By
HJ0225	HISTORY	- 1985	MONUMENTED	NGS

HJ0225 HISTORY - 19910414 GOOD NGS
HJ0225 HISTORY - 19931207 GOOD
HJ0225 HISTORY - 19940207 GOOD CODOT

HJ0225

HJ0225 STATION DESCRIPTION

HJ0225

HJ0225'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985
HJ0225'37.4 KM (23.25 MI) SOUT FROM SPRINGFIELD.
HJ0225'THE MARK IS ABOVE LEVEL WITH THE HIGHWAY.
HJ0225'37.4 KM (23.25 MI) SOUTHERLY ALONG U.S. HIGHWAY 385 FROM THE
HJ0225'COURTHOUSE IN SPRINGFIELD, 1.2 KM (0.75 MI) NORTH OF THE INTERSECTION
HJ0225'OF COUNTY ROAD 28, 0.3 KM (0.2 MI) NORTH OF MILEPOST 7, 14.9 M
HJ0225'(48.9 FT) EAST OF THE CENTERLINE OF THE HIGHWAY, 5.7 M (18.7 FT) NORTH
HJ0225'OF THE CENTER OF GATE AND FIELD ROAD LEADING EAST, AND 2.5 M (8.2 FT)
HJ0225'NORTH OF A T-FENCE CORNER. NOTE--ACCESS TO DATUM POINT IS HAD THROUGH
HJ0225'A 5-INCH LOGO CAP.
HJ0225'THE MARK IS 0.3 METERS W FROM A WITNESS POST AND FENCE

HJ0225

HJ0225 STATION RECOVERY (1991)

HJ0225

HJ0225'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1991
HJ0225'STATION IS LOCATED ABOUT 10 KM (6.2 MI) NORTH OF THE OKLAHOMA STATE
HJ0225'LINE, 2.8 KM (1.7 MI) SOUTH OF CAMPO, ALONG US HIGHWAYS 287 AND 385,
HJ0225'ON THE RIGHT-OF-WAY, AT MILE 7.2, AT A DIM TRACK ROAD LEADING EAST,
HJ0225'ON THE WEST EDGE OF SECTION 14, T 34 S, R 46 W. OWNERSHIP--STATE
HJ0225'DEPARTMENT OF TRANSPORTATION.
HJ0225'TO REACH FROM THE JUNCTION OF US HIGHWAYS 287, 385 AND COUNTY ROAD J
HJ0225'IN CAMPO (MAIN CROSS STREET), GO SOUTH ON HIGHWAYS 287 AND 385 FOR
HJ0225'2.81 KM (1.75 MI) TO A DIM ROAD LEFT AND STATION ON THE LEFT.
HJ0225'STATION MARK IS A PUNCH HOLE TOP CENTER ON A STEEL ROD ENCASED IN A
HJ0225'PVC SLEEVE WITH A LOGO CAP FLUSH WITH THE GROUND. IT IS 14.9 M
HJ0225'(48.9 FT) EAST OF, AND SLIGHTLY LOWER THAN THE HIGHWAY CENTER, 6.0 M
HJ0225'(19.7 FT) NORTH OF THE DIM ROAD CENTER, 0.2 M (0.7 FT) WEST OF A
HJ0225'FIBERGLASS WITNESS POST IN THE RIGHT-OF-WAY FENCE, 2.4 M (7.9 FT)
HJ0225'NORTH OF A 20-CM FENCE CORNER POST AND 2.8 M (9.2 FT) EAST-NORTHEAST
HJ0225'OF THE NORTH END OF A METAL DRAIN PIPE UNDER THE DIM ROAD.
HJ0225'DESCRIBED BY G.R.HEID

HJ0225

HJ0225 STATION RECOVERY (1993)

HJ0225

HJ0225'RECOVERED 1993
HJ0225'RECOVERED IN GOOD CONDITION.

HJ0225

HJ0225 STATION RECOVERY (1994)

HJ0225

HJ0225'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1994
HJ0225'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:04

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER 3, 2019
JJ0107 *****
JJ0107 CBN          - This is a Cooperative Base Network Control Station.
JJ0107 DESIGNATION - E 78
JJ0107 PID          - JJ0107
JJ0107 STATE/COUNTY- CO/KIOWA
JJ0107 COUNTRY     - US
JJ0107 USGS QUAD   - TOWNER (1968)
JJ0107
JJ0107                      *CURRENT SURVEY CONTROL
JJ0107
JJ0107* NAD 83(2011) POSITION- 38 28 18.79723(N) 102 05 15.21376(W)  ADJUSTED
JJ0107* NAD 83(2011) ELLIP HT- 1175.711 (meters) (06/27/12)  ADJUSTED
JJ0107* NAD 83(2011) EPOCH   - 2010.00
JJ0107* NAVD 88 ORTHO HEIGHT - 1199.106 (meters) 3934.07 (feet) ADJUSTED
JJ0107
JJ0107 GEOID HEIGHT - -23.397 (meters) GEOID12B
JJ0107 NAD 83(2011) X - -1,047,226.390 (meters) COMP
JJ0107 NAD 83(2011) Y - -4,890,054.806 (meters) COMP
JJ0107 NAD 83(2011) Z - 3,947,318.173 (meters) COMP
JJ0107 LAPLACE CORR - -3.01 (seconds) DEFLEC12B
JJ0107 DYNAMIC HEIGHT - 1198.004 (meters) 3930.45 (feet) COMP
JJ0107 MODELED GRAVITY - 979,668.1 (mgal) NAVD 88
JJ0107
JJ0107 VERT ORDER - SECOND CLASS 0
JJ0107
JJ0107 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
JJ0107 Standards:
JJ0107      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
JJ0107      Horiz Ellip              SD_N   SD_E   SD_h          (unitless)
JJ0107 -----
JJ0107 NETWORK      1.03    2.33          0.45   0.39   1.19          0.11044734
JJ0107 -----
JJ0107 Click here for local accuracies and other accuracy information.
JJ0107
JJ0107
JJ0107.The horizontal coordinates were established by GPS observations
JJ0107.and adjusted by the National Geodetic Survey in June 2012.
JJ0107
JJ0107.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
JJ0107.been affixed to the stable North American tectonic plate. See
JJ0107.NA2011 for more information.
JJ0107
JJ0107.The horizontal coordinates are valid at the epoch date displayed above
JJ0107.which is a decimal equivalence of Year/Month/Day.
JJ0107
JJ0107.The orthometric height was determined by differential leveling and
JJ0107.adjusted by the NATIONAL GEODETIC SURVEY
JJ0107.in June 1991.
JJ0107

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JJ0107.Significant digits in the geoid height do not necessarily reflect accuracy.
JJ0107.GEOID12B height accuracy estimate available [here](#).

JJ0107

JJ0107.The X, Y, and Z were computed from the position and the ellipsoidal ht.

JJ0107

JJ0107.The Laplace correction was computed from DEFLEC12B derived deflections.

JJ0107

JJ0107.The ellipsoidal height was determined by GPS observations

JJ0107.and is referenced to NAD 83.

JJ0107

JJ0107.The dynamic height is computed by dividing the NAVD 88

JJ0107.geopotential number by the normal gravity value computed on the

JJ0107.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

JJ0107.degrees latitude (g = 980.6199 gals.).

JJ0107

JJ0107.The modeled gravity was interpolated from observed gravity values.

JJ0107

JJ0107. The following values were computed from the NAD 83(2011) position.

JJ0107

JJ0107;		North	East	Units	Scale	Factor	Converg.
JJ0107;SPC CO S	-	510,597.476	1,212,130.056	MT	1.00000726		+2 05 35.2
JJ0107;SPC CO S	-	1,675,185.22	3,976,796.69	sFT	1.00000726		+2 05 35.2
JJ0107;UTM 13	-	4,262,193.580	754,082.265	MT	1.00039510		+1 48 46.4

JJ0107

JJ0107! Elev Factor x Scale Factor = Combined Factor

JJ0107!SPC CO S - 0.99981556 x 1.00000726 = 0.99982282

JJ0107!UTM 13 - 0.99981556 x 1.00039510 = 1.00021059

JJ0107

JJ0107_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGC5408262193(NAD 83)

JJ0107

JJ0107 SUPERSEDED SURVEY CONTROL

JJ0107

JJ0107	NAD 83(2007)-	38 28 18.79717(N)		102 05 15.21449(W)	AD(2002.00)	0
JJ0107	ELLIP H (02/10/07)	1175.732 (m)			GP(2002.00)	
JJ0107	ELLIP H (10/21/02)	1175.742 (m)			GP()	4 2
JJ0107	NAD 83(1986)-	38 28 18.79422(N)		102 05 15.20584(W)	AD()	3
JJ0107	NAD 83(1992)-	38 28 18.79709(N)		102 05 15.21383(W)	AD()	B
JJ0107	ELLIP H (05/26/92)	1175.715 (m)			GP()	4 1
JJ0107	NAVD 88	1199.11 (m)		3934.1 (f)	LEVELING	3
JJ0107	NGVD 29 (??/??/92)	1198.609 (m)		3932.44 (f)	ADJ UNCH	2 0
JJ0107	NGVD 29	1198.61 (m)		3932.4 (f)	LEVELING	3

JJ0107

JJ0107.Superseded values are not recommended for survey control.

JJ0107

JJ0107.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

JJ0107.See file [dsdata.pdf](#) to determine how the superseded data were derived.

JJ0107

JJ0107_MARKER: DB = BENCH MARK DISK

JJ0107_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

JJ0107_STAMPING: E 78 1935

JJ0107_MARK LOGO: CGS

JJ0107_MAGNETIC: O = OTHER; SEE DESCRIPTION

JJ0107_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

JJ0107+STABILITY: SURFACE MOTION

JJ0107_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

JJ0107+SATELLITE: SATELLITE OBSERVATIONS - April 21, 1997

JJ0107

JJ0107 HISTORY - Date Condition Report By

JJ0107 HISTORY - 1935 MONUMENTED CGS

JJ0107 HISTORY - 1941 GOOD CGS

JJ0107 HISTORY - 19910413 GOOD NGS
JJ0107 HISTORY - 19970421 GOOD NGS

JJ0107

JJ0107 STATION DESCRIPTION

JJ0107

JJ0107'DESCRIBED BY COAST AND GEODETIC SURVEY 1941

JJ0107'0.4 MI W FROM TOWNER.

JJ0107'TO REACH BENCH MARK FROM THE TOWNER RAILROAD STATION, GO 0.4 MILE WEST

JJ0107'ALONG THE MISSOURI PACIFIC RAILROAD TO SITE OF BENCH MARK.

JJ0107'BENCH MARK IS NEAR MILE POST 747 AND A ROAD CROSSING, ABOUT 150.0

JJ0107'FEET SOUTHEAST OF THE MILE POLE, 63.0 FEET NORTH OF THE CENTERLINE

JJ0107'OF STATE HIGHWAY 96, 45.0 FEET SOUTH OF AND ABOUT 4.0 FEET BELOW THE

JJ0107'CENTERLINE OF THE RAILROAD TRACK, 40.0 FEET WEST OF THE CENTERLINE

JJ0107'OF A NORTH-SOUTH ROAD, AND 3.0 FEET EAST OF A 4 X 4 INCH WOODEN

JJ0107'MARKER POST. THE MONUMENT PROJECTS 0.5 FOOT. A STANDARD DISK SET IN

JJ0107'CONCRETE POST.

JJ0107

JJ0107 STATION RECOVERY (1991)

JJ0107

JJ0107'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1991

JJ0107'STATION IS LOCATED ABOUT 19 KM (11.8 MI) EAST OF SHERIDAN LAKE, 3.5 KM

JJ0107'(2.2 MI) WEST OF THE KANSAS STATE LINE, 0.6 KM (0.4 MI) WEST OF

JJ0107'TOWNER, AT MILE 205.15 ON US HIGHWAY 96, IN THE NORTHWEST ANGLE OF A

JJ0107'CROSSROAD, IN A BLOW SAND AREA IN A STRIP BETWEEN STATE HIGHWAY 96

JJ0107'AND A RAILROAD TRACK, IN THE SOUTHEAST CORNER OF SECTION 23, T 18 S,

JJ0107'R 42 W. OWNERSHIP--MISSOURI PACIFIC RAILROAD.

JJ0107'TO REACH FROM THE BARTLETT ELEVATOR (WEST ONE OF TWO ELEVATORS) IN

JJ0107'TOWNER, GO WEST ON STATE HIGHWAY 96 FOR 0.65 KM (0.40 MI) TO A

JJ0107'CROSSROAD, (COUNTY ROAD 96 LEADING SOUTH), AND THE STATION ON THE

JJ0107'RIGHT.

JJ0107'STATION MARK IS SET IN THE TOP OF A 20-CM SQUARE CONCRETE POST 5 CM

JJ0107'BELOW SAND LEVEL. IT IS 21.0 M (68.9 FT) NORTH OF, AND 0.5 M

JJ0107'(1.6 FT) LOWER THAN THE HIGHWAY CENTER, 14.2 M (46.6 FT) WEST OF THE

JJ0107'GRAVEL ROAD CENTER, 13.2 M (43.3 FT) SOUTH OF THE SOUTH RAIL OF THE

JJ0107'TRACK, 0.5 M (1.6 FT) SOUTH OF A FIBERGLASS WITNESS POST AND 2.0 M

JJ0107'(6.6 FT) NORTHWEST OF TELEPHONE PEDESTAL A2T/RE.

JJ0107'DESCRIBED BY G.R.HEID

JJ0107

JJ0107 STATION RECOVERY (1997)

JJ0107

JJ0107'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1997 (CSM)

JJ0107'RECOVERED AS DESCRIBED.

*** retrieval complete.

Elapsed Time = 00:00:04

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
HJ0228 *****
HJ0228 DESIGNATION - F 435
HJ0228 PID - HJ0228
HJ0228 STATE/COUNTY- CO/BACA
HJ0228 COUNTRY - US
HJ0228 USGS QUAD - CAMPO NE (1978)
HJ0228
HJ0228 *CURRENT SURVEY CONTROL
HJ0228
HJ0228 * NAD 83(2011) POSITION- 37 08 56.46507(N) 102 36 56.47663(W) ADJUSTED
HJ0228 * NAD 83(2011) ELLIP HT- 1316.038 (meters) (06/27/12) ADJUSTED
HJ0228 * NAD 83(2011) EPOCH - 2010.00
HJ0228 * NAVD 88 ORTHO HEIGHT - 1339.340 (meters) 4394.15 (feet) ADJUSTED
HJ0228
HJ0228 GEOID HEIGHT - -23.302 (meters) GEOID12B
HJ0228 NAD 83(2011) X - -1,111,943.342 (meters) COMP
HJ0228 NAD 83(2011) Y - -4,968,158.404 (meters) COMP
HJ0228 NAD 83(2011) Z - 3,831,382.685 (meters) COMP
HJ0228 LAPLACE CORR - -4.91 (seconds) DEFLEC12B
HJ0228 DYNAMIC HEIGHT - 1337.886 (meters) 4389.38 (feet) COMP
HJ0228 MODELED GRAVITY - 979,498.4 (mgal) NAVD 88
HJ0228
HJ0228 VERT ORDER - FIRST CLASS II
HJ0228
HJ0228 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HJ0228 Standards:
HJ0228 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
HJ0228 Horiz Ellip SD_N SD_E SD_h (unitless)
HJ0228 -----
HJ0228 NETWORK 2.55 2.90 1.17 0.87 1.48 0.08300136
HJ0228 -----
HJ0228 Click here for local accuracies and other accuracy information.
HJ0228
HJ0228
HJ0228 .The horizontal coordinates were established by GPS observations
HJ0228 .and adjusted by the National Geodetic Survey in June 2012.
HJ0228
HJ0228 .NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HJ0228 .been affixed to the stable North American tectonic plate. See
HJ0228 .NA2011 for more information.
HJ0228
HJ0228 .The horizontal coordinates are valid at the epoch date displayed above
HJ0228 .which is a decimal equivalence of Year/Month/Day.
HJ0228
HJ0228 .The orthometric height was determined by differential leveling and
HJ0228 .adjusted by the NATIONAL GEODETIC SURVEY
HJ0228 .in June 1991.
HJ0228
HJ0228 .Significant digits in the geoid height do not necessarily reflect accuracy.

```

HJ0228.GEOID12B height accuracy estimate available [here](#).

HJ0228

HJ0228.The X, Y, and Z were computed from the position and the ellipsoidal ht.

HJ0228

HJ0228.The Laplace correction was computed from DEFLEC12B derived deflections.

HJ0228

HJ0228.The ellipsoidal height was determined by GPS observations

HJ0228.and is referenced to NAD 83.

HJ0228

HJ0228.The dynamic height is computed by dividing the NAVD 88

HJ0228.geopotential number by the normal gravity value computed on the

HJ0228.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

HJ0228.degrees latitude (g = 980.6199 gals.).

HJ0228

HJ0228.The modeled gravity was interpolated from observed gravity values.

HJ0228

HJ0228. The following values were computed from the NAD 83(2011) position.

HJ0228

HJ0228;		North	East	Units	Scale Factor	Converg.
HJ0228;SPC CO S	-	362,289.929	1,170,600.852	MT	1.00001637	+1 46 09.0
HJ0228;SPC CO S	-	1,188,612.88	3,840,546.30	sFT	1.00001637	+1 46 09.0
HJ0228;UTM 13	-	4,114,065.176	711,748.680	MT	1.00015237	+1 26 25.4

HJ0228

HJ0228! Elev Factor x Scale Factor = Combined Factor

HJ0228!SPC CO S - 0.99979352 x 1.00001637 = 0.99980988

HJ0228!UTM 13 - 0.99979352 x 1.00015237 = 0.99994586

HJ0228

HJ0228_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGB1174814065(NAD 83)

HJ0228

HJ0228 SUPERSEDED SURVEY CONTROL

HJ0228

HJ0228 NAD 83(2007)- 37 08 56.46507(N) 102 36 56.47729(W) AD(2002.00) 0

HJ0228 ELLIP H (02/10/07) 1316.057 (m) GP(2002.00)

HJ0228 ELLIP H (12/03/02) 1316.043 (m) GP() 4 2

HJ0228 NAD 83(1992)- 37 08 56.46490(N) 102 36 56.47698(W) AD() 1

HJ0228 ELLIP H (08/11/94) 1316.057 (m) GP() 3 2

HJ0228

HJ0228.Superseded values are not recommended for survey control.

HJ0228

HJ0228.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

HJ0228.See file [dsdata.pdf](#) to determine how the superseded data were derived.

HJ0228

HJ0228_MARKER: I = METAL ROD

HJ0228_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

HJ0228_STAMPING: F 435 1985

HJ0228_MARK LOGO: NGS

HJ0228_PROJECTION: FLUSH

HJ0228_MAGNETIC: N = NO MAGNETIC MATERIAL

HJ0228_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD

HJ0228+STABILITY: POSITION/ELEVATION WELL

HJ0228_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

HJ0228+SATELLITE: SATELLITE OBSERVATIONS - February 07, 1994

HJ0228_ROD/PIPE-DEPTH: 4.3 meters

HJ0228

HJ0228	HISTORY	- Date	Condition	Report By
HJ0228	HISTORY	- 1985	MONUMENTED	NGS
HJ0228	HISTORY	- 19931208	GOOD	
HJ0228	HISTORY	- 19940207	GOOD	CODOT

HJ0228

HJ0228 STATION DESCRIPTION

HJ0228

HJ0228'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985

HJ0228'28.6 KM (17.8 MI) SOUTH FROM SPRINGFIELD.

HJ0228'28.6 KM (17.8 MI) SOUTHERLY ALONG U.S. HIGHWAY 385 FROM THE COURTHOUSE

HJ0228'IN SPRINGFIELD, IN THE NORTHWEST ANGLE OF A CROSSROAD, 42.1 M

HJ0228'(138.1 FT) WEST OF THE CENTERLINE OF THE HIGHWAY, 37.4 M (122.7 FT)

HJ0228'SOUTH OF A UTILITY POLE, 25.0 M (82.0 FT) NORTH OF THE CENTER OF

HJ0228'COUNTY ROAD M, AND 11.9 M (39.0 FT) NORTH OF A FENCE CORNER.

HJ0228'NOTE--ACCESS TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.

HJ0228'THE MARK IS 0.3 METERS E FROM A WITNESS POST AND FENCE

HJ0228'THE MARK IS 1.0 M BELOW THE HIGHWAY.

HJ0228

HJ0228 STATION RECOVERY (1993)

HJ0228

HJ0228'RECOVERED 1993

HJ0228'RECOVERED IN GOOD CONDITION.

HJ0228

HJ0228 STATION RECOVERY (1994)

HJ0228

HJ0228'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1994

HJ0228'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:04

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
JJ0294 *****
JJ0294 DESIGNATION - J 37
JJ0294 PID - JJ0294
JJ0294 STATE/COUNTY- CO/KIOWA
JJ0294 COUNTRY - US
JJ0294 USGS QUAD - DUNLAP RANCH (1982)
JJ0294
JJ0294 *CURRENT SURVEY CONTROL
JJ0294
JJ0294 * NAD 83(2011) POSITION- 38 31 05.96338(N) 102 47 09.20369(W) ADJUSTED
JJ0294 * NAD 83(2011) ELLIP HT- 1273.640 (meters) (06/27/12) ADJUSTED
JJ0294 * NAD 83(2011) EPOCH - 2010.00
JJ0294 * NAVD 88 ORTHO HEIGHT - 1296.266 (meters) 4252.83 (feet) ADJUSTED
JJ0294
JJ0294 GEOID HEIGHT - -22.619 (meters) GEOID12B
JJ0294 NAD 83(2011) X - -1,106,054.707 (meters) COMP
JJ0294 NAD 83(2011) Y - -4,873,873.397 (meters) COMP
JJ0294 NAD 83(2011) Z - 3,951,414.182 (meters) COMP
JJ0294 LAPLACE CORR - -2.31 (seconds) DEFLEC12B
JJ0294 DYNAMIC HEIGHT - 1295.043 (meters) 4248.82 (feet) COMP
JJ0294 MODELED GRAVITY - 979,639.9 (mgal) NAVD 88
JJ0294
JJ0294 VERT ORDER - FIRST CLASS II
JJ0294
JJ0294 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
JJ0294 Standards:
JJ0294 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
JJ0294 Horiz Ellip SD_N SD_E SD_h (unitless)
JJ0294 -----
JJ0294 NETWORK 0.65 1.41 0.27 0.26 0.72 0.12549772
JJ0294 -----
JJ0294 Click here for local accuracies and other accuracy information.
JJ0294
JJ0294
JJ0294 .The horizontal coordinates were established by GPS observations
JJ0294 .and adjusted by the National Geodetic Survey in June 2012.
JJ0294
JJ0294 .NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
JJ0294 .been affixed to the stable North American tectonic plate. See
JJ0294 .NA2011 for more information.
JJ0294
JJ0294 .The horizontal coordinates are valid at the epoch date displayed above
JJ0294 .which is a decimal equivalence of Year/Month/Day.
JJ0294
JJ0294 .The orthometric height was determined by differential leveling and
JJ0294 .adjusted by the NATIONAL GEODETIC SURVEY
JJ0294 .in June 1991.
JJ0294
JJ0294 .Significant digits in the geoid height do not necessarily reflect accuracy.

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JJ0294.GEOID12B height accuracy estimate available [here](#).

JJ0294

JJ0294.[Photographs](#) are available for this station.

JJ0294

JJ0294.The X, Y, and Z were computed from the position and the ellipsoidal ht.

JJ0294

JJ0294.The Laplace correction was computed from DEFLEC12B derived deflections.

JJ0294

JJ0294.The ellipsoidal height was determined by GPS observations

JJ0294.and is referenced to NAD 83.

JJ0294

JJ0294.The dynamic height is computed by dividing the NAVD 88

JJ0294.geopotential number by the normal gravity value computed on the

JJ0294.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

JJ0294.degrees latitude (g = 980.6199 gals.).

JJ0294

JJ0294.The modeled gravity was interpolated from observed gravity values.

JJ0294

JJ0294. The following values were computed from the NAD 83(2011) position.

JJ0294

JJ0294;		North	East	Units	Scale Factor	Converg.
JJ0294;SPC CO S	-	513,751.786	1,151,071.797	MT	1.00001662	+1 39 53.2
JJ0294;SPC CO S	-	1,685,533.98	3,776,474.72	sFT	1.00001662	+1 39 53.2
JJ0294;UTM 13	-	4,265,649.929	693,027.660	MT	1.00005887	+1 22 45.5

JJ0294

JJ0294!
 JJ0294!SPC CO S - Elev Factor x Scale Factor = Combined Factor

JJ0294!SPC CO S - 0.99980020 x 1.00001662 = 0.99981682

JJ0294!UTM 13 - 0.99980020 x 1.00005887 = 0.99985906

JJ0294

JJ0294_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SFC9302765649(NAD 83)

JJ0294

JJ0294

SUPERSEDED SURVEY CONTROL

JJ0294

JJ0294	NAD 83(2007)-	38 31 05.96336(N)	102 47 09.20397(W)	AD(2002.00)	0
JJ0294	ELLIP H (02/10/07)	1273.661 (m)		GP(2002.00)	
JJ0294	ELLIP H (12/03/02)	1273.679 (m)		GP()	4 2
JJ0294	NAD 83(1992)-	38 31 05.96318(N)	102 47 09.20383(W)	AD()	1
JJ0294	ELLIP H (04/04/97)	1273.649 (m)		GP()	4 1
JJ0294	NAVD 88 (04/04/97)	1296.3 (m)	GEOID93 model used	GPS OBS	
JJ0294	NGVD 29 (??/??/92)	1295.706 (m)	4251.00 (f)	ADJ UNCH	1 2

JJ0294

JJ0294.Superseded values are not recommended for survey control.

JJ0294

JJ0294.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

JJ0294.See file [dsdata.pdf](#) to determine how the superseded data were derived.

JJ0294

JJ0294_MARKER: DB = BENCH MARK DISK

JJ0294_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

JJ0294_STAMPING: J 37 1933

JJ0294_MARK LOGO: CGS

JJ0294_MAGNETIC: O = OTHER; SEE DESCRIPTION

JJ0294_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

JJ0294+STABILITY: SURFACE MOTION

JJ0294_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

JJ0294+SATELLITE: SATELLITE OBSERVATIONS - March 08, 2012

JJ0294

JJ0294	HISTORY	- Date	Condition	Report By
JJ0294	HISTORY	- 1933	MONUMENTED	CGS
JJ0294	HISTORY	- 1942	GOOD	CGS
JJ0294	HISTORY	- 1976	GOOD	USGS

JJ0294 HISTORY - 19960329 GOOD CODOT
JJ0294 HISTORY - 20120308 GOOD BOR

JJ0294

JJ0294

STATION DESCRIPTION

JJ0294

JJ0294'DESCRIBED BY COAST AND GEODETIC SURVEY 1942

JJ0294'3.1 MI N FROM EADS.

JJ0294'3.1 MILES NORTH ALONG U.S. HIGHWAY 287 FROM THE COUNTY COURTHOUSE

JJ0294'AT EADS, KIOWA COUNTY, 0.6 MILE SOUTH OF THE INTERSECTION OF AN

JJ0294'EAST-AND-WEST ROAD, 60 FEET SOUTH OF POLE 2980, AND 38 FEET WEST OF

JJ0294'THE CENTERLINE OF THE HIGHWAY. A STANDARD DISK, STAMPED J 37 1933

JJ0294'AND SET IN THE TOP OF A CONCRETE POST.

JJ0294

JJ0294

STATION RECOVERY (1976)

JJ0294

JJ0294'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1976

JJ0294'JUNCTION OF US HIGHWAY 287 AND COLORADO STATE HIGHWAY 96 IN EADS. 2.7

JJ0294'MILES NORTH ALONG US HIGHWAY 287, 0.3 MILES NORTH OF HIGHWAY AT TRAIL

JJ0294'WEST, 55 FEET WEST OF CENTERLINE OF HIGHWAY, 2 FEET EAST OF ROW

JJ0294'FENCE. A STANDARD DISK STAMPED J 37 1933 AND SET IN THE TOP OF A

JJ0294'CONCRETE POST FLUSH WITH GROUND.

JJ0294

JJ0294

STATION RECOVERY (1996)

JJ0294

JJ0294'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1996 (JRZ)

JJ0294'RECOVERED AS DESCRIBED. FROM JUNCTION OF US HIGHWAY 287 AND SH

JJ0294'HIGHWAY 96 IN EADS, TRAVEL 2.7 MILESNORTH ALONG US HIGHWAY 287, 0.3

JJ0294'MILESNORTH OF HIGHWAY AT TRAIL WEST, 55 FEETWEST OF CENTERLINE OF

JJ0294'HIGHWAY. 2 FEETEAST OF ROW FENCE. DISK IS SET IN TOP OF CONCRETE

JJ0294'POST FLUSH WITH GROUND. STATION WAS RECOVERED IN GOOD CONDITION IN

JJ0294'MARCH 1996.

JJ0294

JJ0294

STATION RECOVERY (2012)

JJ0294

JJ0294'RECOVERY NOTE BY US BUREAU OF RECLAMATION 2012 (TAC)

JJ0294'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
HJ0086 *****
HJ0086 DESIGNATION - J 38
HJ0086 PID - HJ0086
HJ0086 STATE/COUNTY- CO/PROWERS
HJ0086 COUNTRY - US
HJ0086 USGS QUAD - CAT CREEK NE (1968)
HJ0086
HJ0086 *CURRENT SURVEY CONTROL
HJ0086
HJ0086 * NAD 83(1986) POSITION- 37 53 46. (N) 102 36 45. (W) SCALED
HJ0086 * NAVD 88 ORTHO HEIGHT - 1184.257 (meters) 3885.35 (feet) ADJUSTED
HJ0086
HJ0086 GEOID HEIGHT - -23.194 (meters) GEOID12B
HJ0086 DYNAMIC HEIGHT - 1183.086 (meters) 3881.51 (feet) COMP
HJ0086 MODELED GRAVITY - 979,600.3 (mgal) NAVD 88
HJ0086
HJ0086 VERT ORDER - FIRST CLASS II
HJ0086
HJ0086.The horizontal coordinates were scaled from a topographic map and have
HJ0086.an estimated accuracy of +/- 6 seconds.
HJ0086.
HJ0086.The orthometric height was determined by differential leveling and
HJ0086.adjusted by the NATIONAL GEODETIC SURVEY
HJ0086.in June 1991.
HJ0086
HJ0086.Significant digits in the geoid height do not necessarily reflect accuracy.
HJ0086.GEOID12B height accuracy estimate available here.
HJ0086
HJ0086.The dynamic height is computed by dividing the NAVD 88
HJ0086.geopotential number by the normal gravity value computed on the
HJ0086.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
HJ0086.degrees latitude (g = 980.6199 gals.).
HJ0086
HJ0086.The modeled gravity was interpolated from observed gravity values.
HJ0086
HJ0086; North East Units Estimated Accuracy
HJ0086;SPC CO S - 445,170. 1,168,320. MT (+/- 180 meters Scaled)
HJ0086
HJ0086_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGB099969(NAD 83)
HJ0086
HJ0086 SUPERSEDED SURVEY CONTROL
HJ0086
HJ0086 NGVD 29 (??/??/92) 1183.670 (m) 3883.42 (f) ADJ UNCH 1 2
HJ0086
HJ0086.Superseded values are not recommended for survey control.
HJ0086
HJ0086.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
HJ0086.See file dsdata.pdf to determine how the superseded data were derived.
HJ0086

```

HJ0086_MARKER: DB = BENCH MARK DISK
 HJ0086_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 HJ0086_STAMPING: J 38 1933
 HJ0086_MARK LOGO: CGS
 HJ0086_PROJECTION: PROJECTING 10 CENTIMETERS
 HJ0086_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 HJ0086+STABILITY: SURFACE MOTION

HJ0086

HJ0086	HISTORY	- Date	Condition	Report By
HJ0086	HISTORY	- 1933	MONUMENTED	CGS
HJ0086	HISTORY	- 1942	GOOD	CGS
HJ0086	HISTORY	- 1967	GOOD	USGS
HJ0086	HISTORY	- 1985	GOOD	NGS

HJ0086

HJ0086

HJ0086

STATION DESCRIPTION

HJ0086'DESCRIBED BY COAST AND GEODETIC SURVEY 1942

HJ0086'13.6 MI S FROM LAMAR.

HJ0086'13.6 MILES SOUTH ALONG U.S. HIGHWAY 287 FROM THE COUNTY COURTHOUSE

HJ0086'AT LAMAR, PROWERS COUNTY, 0.3 MILE NORTH OF CLAY CREEK, IN THE

HJ0086'FRONT YARD OF SUNNY SLOPE SCHOOL, 210 FEET EAST OF THE SOUTHEAST

HJ0086'CORNER OF THE SCHOOLHOUSE, AT A ROAD INTERSECTION, 79 FEET WEST OF

HJ0086'THE CENTERLINE OF THE HIGHWAY, 23 FEET NORTH OF THE CENTERLINE

HJ0086'OF THE ROAD, AND 38 FEET WEST OF POLE 355 E 40. A STANDARD DISK,

HJ0086'STAMPED J 38 1933 AND SET IN THE TOP OF A CONCRETE POST.

HJ0086

HJ0086

HJ0086

STATION RECOVERY (1967)

HJ0086'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1967

HJ0086'RECOVERED IN GOOD CONDITION.

HJ0086

HJ0086

HJ0086

STATION RECOVERY (1985)

HJ0086'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1985

HJ0086'RECOVERED IN GOOD CONDITION. A NEW DESCRIPTION FOLLOWS. 21.0 KM

HJ0086'(13.05 MI) SOUTHERLY ALONG U.S. HIGHWAY 385 FROM THE CORUTHOUSE IN

HJ0086'LAMAR, 0.5 KM (0.3 MI) NORTH OF THE HIGHWAY BRIDGE SPANNING CLAY

HJ0086'CREEK, 57.9 M (190.0 FT) SOUTHEAST OF THE SOUTHEAST CORNER OF THE N.R.

HJ0086'SMITH RESIDENCE, 27.1 M (88.9 FT) WEST OF THE CENTERLINE OF THE

HJ0086'HIGHWAY, 6.4 M (21.0 FT) NORTH OF THE CENTER OF COUNTY ROAD U, AND

HJ0086'6.1 M (20.0 FT) EAST OF THE CENTER OF A DRIVEWAY. NOTE--THE MARK HAS

HJ0086'BEEN HIT AND THE SOUTHWEST CORNER IS CHIPPED, BUT IT IS SOLID IN THE

HJ0086'GROUND.

HJ0086'THE MARK IS 0.3 METERS W FROM A WITNESS POST

HJ0086'THE MARK IS ABOVE LEVEL WITH THE HIGHWAY.

*** retrieval complete.

Elapsed Time = 00:00:03

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
HJ0232 *****
HJ0232 DESIGNATION - K 435
HJ0232 PID - HJ0232
HJ0232 STATE/COUNTY- CO/BACA
HJ0232 COUNTRY - US
HJ0232 USGS QUAD - CAMPO NE (1978)
HJ0232
HJ0232 *CURRENT SURVEY CONTROL
HJ0232
HJ0232* NAD 83(2011) POSITION- 37 14 10.29329(N) 102 36 54.61137(W) ADJUSTED
HJ0232* NAD 83(2011) ELLIP HT- 1323.609 (meters) (06/27/12) ADJUSTED
HJ0232* NAD 83(2011) EPOCH - 2010.00
HJ0232* NAVD 88 ORTHO HEIGHT - 1346.820 (meters) 4418.69 (feet) ADJUSTED
HJ0232
HJ0232 GEOID HEIGHT - -23.219 (meters) GEOID12B
HJ0232 NAD 83(2011) X - -1,110,622.180 (meters) COMP
HJ0232 NAD 83(2011) Y - -4,962,466.003 (meters) COMP
HJ0232 NAD 83(2011) Z - 3,839,095.832 (meters) COMP
HJ0232 LAPLACE CORR - -4.88 (seconds) DEFLEC12B
HJ0232 DYNAMIC HEIGHT - 1345.372 (meters) 4413.94 (feet) COMP
HJ0232 MODELED GRAVITY - 979,508.3 (mgal) NAVD 88
HJ0232
HJ0232 VERT ORDER - FIRST CLASS II
HJ0232
HJ0232 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HJ0232 Standards:
HJ0232 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
HJ0232 Horiz Ellip SD_N SD_E SD_h (unitless)
HJ0232 -----
HJ0232 NETWORK 1.71 2.12 0.77 0.61 1.08 0.13727117
HJ0232 -----
HJ0232 Click here for local accuracies and other accuracy information.
HJ0232
HJ0232
HJ0232.The horizontal coordinates were established by GPS observations
HJ0232.and adjusted by the National Geodetic Survey in June 2012.
HJ0232
HJ0232.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HJ0232.been affixed to the stable North American tectonic plate. See
HJ0232.NA2011 for more information.
HJ0232
HJ0232.The horizontal coordinates are valid at the epoch date displayed above
HJ0232.which is a decimal equivalence of Year/Month/Day.
HJ0232
HJ0232.The orthometric height was determined by differential leveling and
HJ0232.adjusted by the NATIONAL GEODETIC SURVEY
HJ0232.in June 1991.
HJ0232
HJ0232.Significant digits in the geoid height do not necessarily reflect accuracy.

```

HJ0232.GEOID12B height accuracy estimate available [here](#).

HJ0232

HJ0232.The X, Y, and Z were computed from the position and the ellipsoidal ht.

HJ0232

HJ0232.The Laplace correction was computed from DEFLEC12B derived deflections.

HJ0232

HJ0232.The ellipsoidal height was determined by GPS observations

HJ0232.and is referenced to NAD 83.

HJ0232

HJ0232.The dynamic height is computed by dividing the NAVD 88

HJ0232.geopotential number by the normal gravity value computed on the

HJ0232.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

HJ0232.degrees latitude (g = 980.6199 gals.).

HJ0232

HJ0232.The modeled gravity was interpolated from observed gravity values.

HJ0232

HJ0232. The following values were computed from the NAD 83(2011) position.

HJ0232

HJ0232;		North	East	Units	Scale Factor	Converg.
HJ0232;SPC CO S	-	371,961.548	1,170,348.116	MT	0.99999948	+1 46 10.2
HJ0232;SPC CO S	-	1,220,343.85	3,839,717.11	sFT	0.99999948	+1 46 10.2
HJ0232;UTM 13	-	4,123,739.474	711,551.173	MT	1.00015133	+1 26 37.0

HJ0232

HJ0232! - Elev Factor x Scale Factor = Combined Factor

HJ0232!SPC CO S - 0.99979233 x 0.99999948 = 0.99979181

HJ0232!UTM 13 - 0.99979233 x 1.00015133 = 0.99994363

HJ0232

HJ0232_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGB1155123739(NAD 83)

HJ0232

HJ0232 SUPERSEDED SURVEY CONTROL

HJ0232

HJ0232	NAD 83(2007)-	37 14 10.29327(N)	102 36 54.61202(W)	AD(2002.00)	0
HJ0232	ELLIP H (02/10/07)	1323.629 (m)		GP(2002.00)	
HJ0232	ELLIP H (12/03/02)	1323.620 (m)		GP()	4 2
HJ0232	NAD 83(1992)-	37 14 10.29308(N)	102 36 54.61168(W)	AD()	1
HJ0232	ELLIP H (08/11/94)	1323.639 (m)		GP()	3 2

HJ0232

HJ0232.Superseded values are not recommended for survey control.

HJ0232

HJ0232.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

HJ0232.See file [dsdata.pdf](#) to determine how the superseded data were derived.

HJ0232

HJ0232_MARKER: I = METAL ROD

HJ0232_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

HJ0232_STAMPING: K 435 1985

HJ0232_MARK LOGO: NGS

HJ0232_PROJECTION: FLUSH

HJ0232_MAGNETIC: N = NO MAGNETIC MATERIAL

HJ0232_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD

HJ0232+STABILITY: POSITION/ELEVATION WELL

HJ0232_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

HJ0232+SATELLITE: SATELLITE OBSERVATIONS - February 07, 1994

HJ0232_ROD/PIPE-DEPTH: 13.4 meters

HJ0232

HJ0232	HISTORY	- Date	Condition	Report By
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HJ0232	HISTORY	- 1985	MONUMENTED	NGS
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HJ0232	HISTORY	- 19931207	GOOD	
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HJ0232	HISTORY	- 19940207	GOOD	CODOT
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HJ0232

HJ0232 STATION DESCRIPTION

HJ0232

HJ0232'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985

HJ0232'18.9 KM (11.75 MI) SOUT FROM SPRINGFIELD.

HJ0232'18.9 KM (11.75 MI) SOUTHERLY ALONG U.S. HIGHWAY 385 FROM THE

HJ0232'COURTHOUSE IN SPRINGFIELD, 35.1 M (115.0 FT) NORTHWEST OF A FENCE

HJ0232'CORNER, 34.1 M (111.9 FT) NORTH OF THE CENTER OF COUNTY ROAD T, 23.2 M

HJ0232'(76.1 FT) EAST OF THE CENTERLINE OF THE HIGHWAY, AND 12.2 M (40.0 FT)

HJ0232'SOUTHEAST OF A FENCE CORNER. NOTE--ACCESS TO DATUM POINT IS HAD

HJ0232'THROUGH A 5-INCH LOGO CAP.

HJ0232'THE MARK IS 0.3 METERS SW FROM A WITNESS POST AND FENCE

HJ0232'THE MARK IS 1.0 M BELOW THE HIGHWAY.

HJ0232

HJ0232 STATION RECOVERY (1993)

HJ0232

HJ0232'RECOVERED 1993

HJ0232'RECOVERED IN GOOD CONDITION.

HJ0232

HJ0232 STATION RECOVERY (1994)

HJ0232

HJ0232'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1994

HJ0232'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:04

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
JJ0701 *****
JJ0701 DESIGNATION - L 433
JJ0701 PID - JJ0701
JJ0701 STATE/COUNTY- CO/PROWERS
JJ0701 COUNTRY - US
JJ0701 USGS QUAD - LAMAR EAST (1979)
JJ0701
JJ0701 *CURRENT SURVEY CONTROL
JJ0701
JJ0701 *-----*
JJ0701* NAD 83(2011) POSITION- 38 01 51.56324(N) 102 36 51.46896(W) ADJUSTED
JJ0701* NAD 83(2011) ELLIP HT- 1112.414 (meters) (06/27/12) ADJUSTED
JJ0701* NAD 83(2011) EPOCH - 2010.00
JJ0701* NAVD 88 ORTHO HEIGHT - 1135.693 (meters) 3726.02 (feet) ADJUSTED
JJ0701 *-----*
JJ0701 GEOID HEIGHT - -23.275 (meters) GEOID12B
JJ0701 NAD 83(2011) X - -1,098,744.614 (meters) COMP
JJ0701 NAD 83(2011) Y - -4,909,745.789 (meters) COMP
JJ0701 NAD 83(2011) Z - 3,908,839.313 (meters) COMP
JJ0701 LAPLACE CORR - -3.02 (seconds) DEFLEC12B
JJ0701 DYNAMIC HEIGHT - 1134.600 (meters) 3722.43 (feet) COMP
JJ0701 MODELED GRAVITY - 979,627.9 (mgal) NAVD 88
JJ0701
JJ0701 VERT ORDER - FIRST CLASS II
JJ0701
JJ0701 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
JJ0701 Standards:
JJ0701 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
JJ0701 Horiz Ellip SD_N SD_E SD_h (unitless)
JJ0701 -----
JJ0701 NETWORK 1.05 2.37 0.46 0.39 1.21 0.03362438
JJ0701 -----
JJ0701 Click here for local accuracies and other accuracy information.
JJ0701
JJ0701
JJ0701.The horizontal coordinates were established by GPS observations
JJ0701.and adjusted by the National Geodetic Survey in June 2012.
JJ0701
JJ0701.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
JJ0701.been affixed to the stable North American tectonic plate. See
JJ0701.NA2011 for more information.
JJ0701
JJ0701.The horizontal coordinates are valid at the epoch date displayed above
JJ0701.which is a decimal equivalence of Year/Month/Day.
JJ0701
JJ0701.The orthometric height was determined by differential leveling and
JJ0701.adjusted by the NATIONAL GEODETIC SURVEY
JJ0701.in June 1991.
JJ0701
JJ0701.Significant digits in the geoid height do not necessarily reflect accuracy.

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JJ0701.GEOID12B height accuracy estimate available [here](#).

JJ0701

JJ0701.The X, Y, and Z were computed from the position and the ellipsoidal ht.

JJ0701

JJ0701.The Laplace correction was computed from DEFLEC12B derived deflections.

JJ0701

JJ0701.The ellipsoidal height was determined by GPS observations

JJ0701.and is referenced to NAD 83.

JJ0701

JJ0701.The dynamic height is computed by dividing the NAVD 88

JJ0701.geopotential number by the normal gravity value computed on the

JJ0701.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

JJ0701.degrees latitude (g = 980.6199 gals.).

JJ0701

JJ0701.The modeled gravity was interpolated from observed gravity values.

JJ0701

JJ0701. The following values were computed from the NAD 83(2011) position.

JJ0701

JJ0701;		North	East	Units	Scale Factor	Converg.
JJ0701;SPC CO S	-	460,132.466	1,167,700.897	MT	0.99995128	+1 46 12.1
JJ0701;SPC CO S	-	1,509,617.93	3,831,032.03	sFT	0.99995128	+1 46 12.1
JJ0701;UTM 13	-	4,211,939.951	709,384.899	MT	1.00014000	+1 28 13.2

JJ0701

JJ0701! Elev Factor x Scale Factor = Combined Factor

JJ0701!SPC CO S - 0.99982548 x 0.99995128 = 0.99977677

JJ0701!UTM 13 - 0.99982548 x 1.00014000 = 0.99996545

JJ0701

JJ0701_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGC0938411939(NAD 83)

JJ0701

JJ0701 SUPERSEDED SURVEY CONTROL

JJ0701

JJ0701	NAD 83(2007)-	38 01 51.56320(N)	102 36 51.46959(W)	AD(2002.00)	0
JJ0701	ELLIP H (02/10/07)	1112.434 (m)		GP(2002.00)	
JJ0701	ELLIP H (12/03/02)	1112.444 (m)		GP()	4 2
JJ0701	NAD 83(1992)-	38 01 51.56312(N)	102 36 51.46890(W)	AD()	1
JJ0701	ELLIP H (04/04/97)	1112.408 (m)		GP()	4 1
JJ0701	NAVD 88 (04/04/97)	1135.7 (m)	GEOID93 model used	GPS OBS	

JJ0701

JJ0701.Superseded values are not recommended for survey control.

JJ0701

JJ0701.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

JJ0701.See file [dsdata.pdf](#) to determine how the superseded data were derived.

JJ0701

JJ0701_MARKER: I = METAL ROD

JJ0701_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

JJ0701_STAMPING: L 433 1985

JJ0701_MARK LOGO: NGS

JJ0701_PROJECTION: FLUSH

JJ0701_MAGNETIC: O = OTHER; SEE DESCRIPTION

JJ0701_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

JJ0701_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

JJ0701+SATELLITE: SATELLITE OBSERVATIONS - March 08, 2012

JJ0701_ROD/PIPE-DEPTH: 6.4 meters

JJ0701

JJ0701	HISTORY	- Date	Condition	Report By
JJ0701	HISTORY	- 1985	MONUMENTED	NGS
JJ0701	HISTORY	- 19960325	GOOD	CODOT
JJ0701	HISTORY	- 20120308	GOOD	BOR

JJ0701

JJ0701 STATION DESCRIPTION

JJ0701

JJ0701'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985

JJ0701'6.4 KM (4.0 MI) SOUTH FROM LAMAR.

JJ0701'6.4 KM (4.0 MI) SOUTHERLY ALONG U.S. HIGHWAY 385 FROM THE COURTHOUSE

JJ0701'IN LAMAR, 29.4 M (96.5 FT) WEST OF THE CENTERLINE OF THE HIGHWAY, 26.0

JJ0701'M (85.3 FT) NORTH OF THE EXTENDED CENTER OF MEMORIAL DRIVE, AND 1.4 M

JJ0701'(4.6 FT) SOUTH-SOUTHEAST OF A UTILITY POLE. NOTE--ACCESS TO DATUM

JJ0701'POINT IS HAD THROUGH A 5-INCH LOGO CAP.

JJ0701'THE MARK IS 0.3 METERS E FROM A WITNESS POST AND FENCE

JJ0701'THE MARK IS ABOVE LEVEL WITH THE HIGHWAY.

JJ0701

JJ0701

STATION RECOVERY (1996)

JJ0701

JJ0701'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1996 (JRZ)

JJ0701'RECOVERED AS DESCRIBED. FROM THE COURTHOUSE IN LAMAR, TAKE US HIGHWAY

JJ0701'385 SOUTH 6.4 KM (3.98 MI) . STATION IS 29.4 M (96.46 FT) WEST OF THE

JJ0701'CENTERLINE OF OF THE HIGHWAY, 26.0 M (85.30 FT) NORTH OF THE EXTENDED

JJ0701'CENTER OF MEMORIAL DRIVE, AND 1.4 M (4.59 FT) SOUTH-SOUTHEAST OF A

JJ0701'UTILITY PLOE. ACCESS TO DATUM POINT IS THROUGH A 5 INCH LOGO CAP.

JJ0701'THE MARK IS ABOVE THE LEVEL OF THE HIGHWAY. THE STATION WAS RECOVERED

JJ0701'IN GOOD CONDITION IN MARCH 1996.

JJ0701

JJ0701

STATION RECOVERY (2012)

JJ0701

JJ0701'RECOVERY NOTE BY US BUREAU OF RECLAMATION 2012 (TAC)

JJ0701'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER 3, 2019
JJ0211 *****
JJ0211 FBN          -  This is a Federal Base Network Control Station.
JJ0211 DESIGNATION -  N 37
JJ0211 PID          -  JJ0211
JJ0211 STATE/COUNTY-  CO/KIOWA
JJ0211 COUNTRY      -  US
JJ0211 USGS QUAD    -  ALKALI LAKE (1968)
JJ0211
JJ0211                      *CURRENT SURVEY CONTROL
JJ0211
JJ0211 * NAD 83(2011) POSITION- 38 26 25.06970(N) 102 43 50.67278(W)  ADJUSTED
JJ0211 * NAD 83(2011) ELLIP HT- 1241.091 (meters) (06/27/12)  ADJUSTED
JJ0211 * NAD 83(2011) EPOCH   - 2010.00
JJ0211 * NAVD 88 ORTHO HEIGHT - 1263.844 (meters) 4146.46 (feet) ADJUSTED
JJ0211
JJ0211 GEOID HEIGHT   -      -22.769 (meters) GEOID12B
JJ0211 NAD 83(2011) X - -1,102,545.337 (meters) COMP
JJ0211 NAD 83(2011) Y - -4,880,168.770 (meters) COMP
JJ0211 NAD 83(2011) Z - 3,944,612.221 (meters) COMP
JJ0211 LAPLACE CORR   -      -1.97 (seconds) DEFLEC12B
JJ0211 DYNAMIC HEIGHT -      1262.651 (meters) 4142.55 (feet) COMP
JJ0211 MODELED GRAVITY -      979,640.7 (mgal) NAVD 88
JJ0211
JJ0211 VERT ORDER      -  FIRST      CLASS II
JJ0211
JJ0211 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
JJ0211 Standards:
JJ0211      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
JJ0211      Horiz Ellip              SD_N   SD_E   SD_h      (unitless)
JJ0211 -----
JJ0211 NETWORK      0.49   1.00              0.21   0.19   0.51      0.09302082
JJ0211 -----
JJ0211 Click here for local accuracies and other accuracy information.
JJ0211
JJ0211
JJ0211.The horizontal coordinates were established by GPS observations
JJ0211.and adjusted by the National Geodetic Survey in June 2012.
JJ0211
JJ0211.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
JJ0211.been affixed to the stable North American tectonic plate. See
JJ0211.NA2011 for more information.
JJ0211
JJ0211.The horizontal coordinates are valid at the epoch date displayed above
JJ0211.which is a decimal equivalence of Year/Month/Day.
JJ0211
JJ0211.The orthometric height was determined by differential leveling and
JJ0211.adjusted by the NATIONAL GEODETIC SURVEY
JJ0211.in June 1991.
JJ0211

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JJ0211. Significant digits in the geoid height do not necessarily reflect accuracy.
 JJ0211. GEOID12B height accuracy estimate available [here](#).
 JJ0211
 JJ0211. [Photographs](#) are available for this station.
 JJ0211
 JJ0211. The X, Y, and Z were computed from the position and the ellipsoidal ht.
 JJ0211
 JJ0211. The Laplace correction was computed from DEFLEC12B derived deflections.
 JJ0211
 JJ0211. The ellipsoidal height was determined by GPS observations
 JJ0211. and is referenced to NAD 83.

JJ0211
 JJ0211. The dynamic height is computed by dividing the NAVD 88
 JJ0211. geopotential number by the normal gravity value computed on the
 JJ0211. Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 JJ0211. degrees latitude (g = 980.6199 gals.).
 JJ0211
 JJ0211. The modeled gravity was interpolated from observed gravity values.
 JJ0211
 JJ0211. The following values were computed from the NAD 83(2011) position.

JJ0211;		North	East	Units	Scale Factor	Converg.
JJ0211;SPC CO S	-	505,235.338	1,156,135.993	MT	1.00000128	+1 41 55.0
JJ0211;SPC CO S	-	1,657,592.94	3,793,089.50	sFT	1.00000128	+1 41 55.0
JJ0211;UTM 13	-	4,257,107.742	698,049.534	MT	1.00008306	+1 24 40.5
JJ0211!	-	Elev Factor	x	Scale Factor	=	Combined Factor
JJ0211!SPC CO S	-	0.99980530	x	1.00000128	=	0.99980658
JJ0211!UTM 13	-	0.99980530	x	1.00008306	=	0.99988835

JJ0211:		Primary Azimuth Mark	Grid Az
JJ0211:SPC CO S	-	N 37 AZ MK	173 50 10.9
JJ0211:UTM 13	-	N 37 AZ MK	174 07 25.4

JJ0211_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SFC9804957107(NAD 83)

JJ0211	PID	Reference Object	Distance	Geod. Az
JJ0211				dddmmss.s
JJ0211	CM8399	N 37 RM 1	14.788 METERS	02054
JJ0211	CM8398	N 37 AZ MK		1753205.9
JJ0211	CM8400	N 37 RM 2	31.850 METERS	27328
JJ0211	JJ0864	EADS MUNICIPAL WATER STANDPIPE	APPROX. 6.1 KM	3131444.0
JJ0211	JJ0863	EADS H B S GRAIN ELEV	APPROX. 6.1 KM	3143712.5
JJ0211	JJ0862	EADS MUNICIPAL TANK	APPROX. 6.1 KM	3144718.2

JJ0211	SUPERSEDED SURVEY CONTROL							
JJ0211	NAD 83(2007)-	38 26 25.06967(N)	102 43 50.67325(W)	AD(2002.00)	0			
JJ0211	ELLIP H (02/10/07)	1241.114 (m)		GP(2002.00)				
JJ0211	ELLIP H (09/24/02)	1241.117 (m)		GP()	3 1			
JJ0211	NAD 83(1992)-	38 26 25.06954(N)	102 43 50.67291(W)	AD()	B			
JJ0211	ELLIP H (05/26/92)	1241.081 (m)		GP()	4 1			
JJ0211	NAD 83(1986)-	38 26 25.06949(N)	102 43 50.66614(W)	AD()	3			
JJ0211	NAD 27	- 38 26 25.04758(N)	102 43 48.96922(W)	AD()	3			
JJ0211	NAVD 88	1263.84 (m)	4146.4	(f) LEVELING	3			
JJ0211	NGVD 29 (??/??/92)	1263.282 (m)	4144.62	(f) ADJ UNCH	1 2			
JJ0211	NGVD 29	1263.28 (m)	4144.6	(f) LEVELING	3			

JJ0211.Superseded values are not recommended for survey control.

JJ0211

JJ0211.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

JJ0211.See file [dsdata.pdf](#) to determine how the superseded data were derived.

JJ0211

JJ0211_MARKER: DB = BENCH MARK DISK

JJ0211_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

JJ0211_STAMPING: N 37 1933

JJ0211_MARK LOGO: CGS

JJ0211_MAGNETIC: N = NO MAGNETIC MATERIAL

JJ0211_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

JJ0211+STABILITY: SURFACE MOTION

JJ0211_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

JJ0211+SATELLITE: SATELLITE OBSERVATIONS - October 21, 2002

JJ0211

JJ0211	HISTORY	- Date	Condition	Report By
JJ0211	HISTORY	- 1933	MONUMENTED	CGS
JJ0211	HISTORY	- 1967	GOOD	USGS
JJ0211	HISTORY	- 1978	GOOD	NGS
JJ0211	HISTORY	- 19910413	GOOD	NGS
JJ0211	HISTORY	- 19960329	GOOD	CODOT
JJ0211	HISTORY	- 19990421	GOOD	NGS
JJ0211	HISTORY	- 20021021	GOOD	CODOT

JJ0211

JJ0211

STATION DESCRIPTION

JJ0211

JJ0211'DESCRIBED BY COAST AND GEODETIC SURVEY 1933 (WRH)

JJ0211'THE STATION IS LOCATED AIRLINE, ABOUT 4-1/2 MILES SOUTHEAST OF

JJ0211'EADS AND ABOUT 10 MILES WEST OF CHEVINGTON ALONG THE WEST SIDE OF

JJ0211'U.S. HIGHWAY 287.

JJ0211'

JJ0211'THE STATION IS A STANDARD U.S.C. AND G.S. BENCH MARK DISK

JJ0211'STAMPED N37 1933 SET IN TOP OF A 12-INCH SQUARE CONCRETE

JJ0211'MONUMENT WHICH PROJECTS ABOUT 4 INCHES ABOVE THE GROUND. IT

JJ0211'IS 69 FEET WEST OF THE CENTER LINE OF THE HIGHWAY, 24 FEET NORTH

JJ0211'OF THE CENTER LINE OF A DIRT ROAD AND 7 FEET WEST OF A WHITE

JJ0211'WITNESS POST.

JJ0211'

JJ0211'REFERENCE MARK NUMBER ONE IS A STANDARD DISK STAMPED BM N37

JJ0211'NO 1 1954 SET IN TOP OF A 10-INCH SQUARE CONCRETE MONUMENT WHICH

JJ0211'PROJECTS ABOUT 3 INCHES ABOVE THE GROUND AND IS ABOUT THE SAME

JJ0211'ELEVATION AS THE STATION. IT IS 6 INCHES WEST OF A NORTH-SOUTH

JJ0211'FENCE LINE AND 33 FEET WEST OF THE CENTER LINE OF THE HIGHWAY.

JJ0211'

JJ0211'REFERENCE MARK NUMBER TWO IS A STANDARD DISK STAMPED BM N37

JJ0211'NO 2 1954 SET IN TOP OF A 10-INCH SQUARE CONCRETE MONUMENT

JJ0211'WHICH PROJECTS ABOUT 2 INCHES ABOVE THE GROUND AND IS ABOUT

JJ0211'THE SAME ELEVATION AS THE STATION. IT IS 4 FEET NORTH OF AN

JJ0211'EAST-WEST FENCE LINE AND 24 FEET NORTH OF THE CENTER LINE

JJ0211'OF A DIRT ROAD.

JJ0211'

JJ0211'THE AZIMUTH MARK IS A STANDARD DISK STAMPED BM N37 1954 SET IN

JJ0211'TOP OF A 10-INCH SQUARE CONCRETE MONUMENT WHICH PROJECTS ABOUT

JJ0211'5 INCHES ABOVE THE GROUND. IT IS 48 FEET EAST OF THE CENTER LINE

JJ0211'OF THE HIGHWAY AND IS 1 FOOT WEST OF A NORTH-SOUTH FENCE LINE.

JJ0211'

JJ0211'TO REACH THE AZIMUTH MARK FROM THE STATION, GO SOUTH ON U.S.

JJ0211'HIGHWAY 287 FOR 0.3 MILE TO THE AZIMUTH MARK ON THE LEFT, EAST

JJ0211'SIDE.

JJ0211'

JJ0211'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAY 287 AND
JJ0211'STATE HIGHWAY 96 IN EADS, GO EAST ON U.S. HIGHWAY 287 AND
JJ0211'STATE HIGHWAY 96 FOR 2.7 MILES TO A JUNCTION. TURN SOUTH AND
JJ0211'FOLLOW U.S. HIGHWAY 287 FOR 4.3 MILES TO A CROSS ROAD, A WHITE
JJ0211'WITNESS POST AND THE STATION ON THE RIGHT, WEST SIDE.

JJ0211

JJ0211

STATION RECOVERY (1967)

JJ0211

JJ0211'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1967

JJ0211'5 MI SW FROM EADS.

JJ0211'5.0 MILES WEST AND SOUTH FROM THE MISSOURI PACIFIC RR STATION AT EADS

JJ0211'ALONG U.S. HIGHWAY 287, AT THE INTERSECTION OF A GRADED ROAD, 70

JJ0211'FEET WEST OF CENTERLINE OF HIGHWAY, 30 FEET NORTH OF CENTERLINE

JJ0211'ROAD, 20 FEET WEST OF POWERPOLE, 18 FEET WEST OF R.O.W. FENCE CORNER,

JJ0211'2 FEET SOUTH OF FENCE, 1 FOOT SOUTH OF STEEL WITNESS POST. A

JJ0211'STANDARD TABLET STAMPED N 37 1933 AND SET IN THE TOP OF A

JJ0211'CONCRETE POST PROJECTING 0.3 FOOT.

JJ0211

JJ0211

STATION RECOVERY (1978)

JJ0211

JJ0211'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1978 (CLN)

JJ0211'STATION RECOVERED AND ALL MARKS ARE IN GOOD CONDITION. DISTANCE AND

JJ0211'DIRECTION TO REFERENCE MARK NUMBER 2 CHECKED ADEQUATELY. DIRECTION TO

JJ0211'REFERENCE MARK NUMBER 1 ALSO CHECKED ADEQUATELY BUT THE DISTANCE TO

JJ0211'THE MARK DID NOT COMPARE WITH PREVIOUS DATA BY 0.016 METERS.

JJ0211'

JJ0211'LOCATION OF STATION IS STILL ADEQUATE BUT A DISCREPANCY IN MILEAGE

JJ0211'IN ROUTE TO STATION WAS NOTED.

JJ0211'

JJ0211'STATION IS REACHED FROM THE POST OFFICE IN EADS. GO SOUTH ON MAINE

JJ0211'STREET FOR 0.2 MILE TO JUNCTION WITH U.S. HIGHWAY 287 AND STATE

JJ0211'HIGHWAY 96. TURN LEFT AND GO EAST ON THE HIGHWAY FOR 2.7 MILES TO THE

JJ0211'EAST JUNCTION OF THE TWO HIGHWAYS. TURN RIGHT AND GO SOUTH ON

JJ0211'HIGHWAY 287 FOR 2.25 MILES TO A CROSS ROAD AND STATION ON RIGHT, AS

JJ0211'DESCRIBED. CONTINUE SOUTH ON HIGHWAY 287 FOR 0.3 MILE TO THE

JJ0211'AZIMUTH MARK ON THE LEFT, AS DESCRIBED.

JJ0211'

JJ0211'STATION IS A STANDARD BENCH MARK DISK, STAMPED---N 37 1933---SET IN

JJ0211'TOP OF A SQUARE CONCRETE MONUMENT PROJECTING 9 INCHES, 59 FEET WEST

JJ0211'OF CENTER OF U.S. HIGHWAY 287, 28 FEET NORTH OF CENTER OF AN EAST-WEST

JJ0211'GRAVELED ROAD, 21 FEET WEST OF A FENCE CORNER POST, 3 FEET SOUTH OF AN

JJ0211'EAST-WEST FENCE LINE, 1.8 FEET NORTHEAST OF A METAL WITNESS POST, 1.6

JJ0211'FEET SOUTH-SOUTHEAST OF A METAL WITNESS POST.

JJ0211'

JJ0211'REFERENCE MARK 1 IS A STANDARD DISK, STAMPED---BM N 37 NO 1 1954---

JJ0211'SET IN TOP OF A SQUARE CONCRETE MONUMENT PROJECTING 1 INCH, 51 FEET

JJ0211'WEST OF CENTER OF THE HIGHWAY, 1 FOOT WEST OF A NORTH-SOUTH FENCE.

JJ0211'

JJ0211'REFERENCE MARK 2 IS A STANDARD DISK, STAMPED---BM N 37 NO 2 1954---

JJ0211'SET IN TOP OF A SQUARE CONCRETE MONUMENT PROJECTING 2 INCHES, 34 FEET

JJ0211'NORTH OF CENTER OF THE GRAVELED ROAD, 4 FEET NORTH OF EAST-WEST FENCE.

JJ0211'

JJ0211'AZIMUTH MARK IS A STANDARD DISK, STAMPED---BM N 37 1954---SET IN

JJ0211'TOP OF A SQUARE CONCRETE MONUMENT PROJECTING 1 INCH, 46 FEET EAST OF

JJ0211'CENTER OF HIGHWAY 287, 10 FEET WEST OF WEST EDGE OF A CULTIVATED

JJ0211'FIELD, 2.3 FEET NORTH OF A METAL WITNESS POST.

JJ0211

JJ0211

STATION RECOVERY (1991)

JJ0211

JJ0211'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1991

JJ0211'STATION IS LOCATED ABOUT 6.5 KM (4.0 MI) SOUTHEAST OF EADS, 3.5 KM
JJ0211'(2.2 MI) SOUTH OF THE JUNCTION OF US HIGHWAY 287 AND STATE HIGHWAY
JJ0211'96, ALONG HIGHWAY 287, IN THE NORTHWEST ANGLE OF A CROSSROAD, ON
JJ0211'COUNTY RIGHT-OF-WAY, IN THE SOUTHEAST CORNER OF SECTION 36, T 18 S, R
JJ0211'48 W. OWNERSHIP--KIOWA COUNTY.

JJ0211'TO REACH FROM THE JUNCTION OF US HIGHWAY 287 AND STATE HIGHWAY 96 IN
JJ0211'EADS, GO EAST ON HIGHWAYS 287 AND 96 FOR 4.72 KM (2.93 MI) TO A CURVE
JJ0211'RIGHT AND HIGHWAY 96 LEADING EAST. CONTINUE SOUTH ON HIGHWAY 287 FOR
JJ0211'3.59 KM (2.23 MI) TO A DIRT CROSSROAD AND THE STATION ON THE RIGHT.

JJ0211'STATION MARK IS SET IN THE TOP OF A 30-CM SQUARE CONCRETE POST
JJ0211'PROJECTING 15 CM. IT IS 20.9 M (68.6 FT) WEST OF THE HIGHWAY CENTER,
JJ0211'9.0 M (29.5 FT) NORTH OF, AND LEVEL WITH THE ROAD CENTER, 0.6 M
JJ0211'(2.0 FT) NORTHEAST OF A METAL WITNESS POST, 0.6 M (2.0 FT) SOUTH OF A
JJ0211'FIBERGLASS WITNESS POST AND 0.8 M (2.6 FT) SOUTH OF A WIRE FENCE.

JJ0211'DESCRIBED BY G.R.HEID

JJ0211

JJ0211 STATION RECOVERY (1996)

JJ0211

JJ0211'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1996 (JRZ)
JJ0211'RECOVERED AS DESCRIBED. NEAR S.H. 287 MILEPOST 108.3. TO REACH FROM
JJ0211'EADS, GO EAST ON HIGHWAY 287 4.72 KM (2.93 MI) TO A CURVE RIGHT.
JJ0211'CONTINUE SOUTH ON HIGHWAY 287 FOR 3.59 KM (2.23 MI) TO A DIRT
JJ0211'CROSSROAD AND THE STATION ON THE RIGHT. STATION MARK IS SET IN THE
JJ0211'TOP OF A 30 CM SQUARE CONCRETE POST PROJECTING 10 CM FROM THE SURFACE
JJ0211'. STATION WAS RECOVERED IN GOOD CONDITION IN MARCH 1996.

JJ0211

JJ0211 STATION RECOVERY (1999)

JJ0211

JJ0211'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (RSC)
JJ0211'THE STATION WAS RECOVERED IN GOOD CONDITION WITH THE FOLLOWING
JJ0211'ADDITIONS TO THE DESCRIPTION. IT IS 0.45 M SOUTH FROM A T-POST AND
JJ0211'RIGHT-OF-WAY FENCE, 0.65 M NORTHWEST FROM A T-POST, 0.7 M NORTHEAST
JJ0211'FROM A T-POST AND 5.5 M WEST FROM A FENCE CORNER.

JJ0211

JJ0211 STATION RECOVERY (2002)

JJ0211

JJ0211'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 2002 (RAQ)
JJ0211'THE STATION IS LOCATED ABOUT 4.5 MILES SOUTHEAST OF EADS, ON COUNTY
JJ0211'ROAD RIGHT-OF-WAY.
JJ0211'TO REACH THE STATION FROM EADS, GO EAST ON STATE HIGHWAY 287 FOR 2.93
JJ0211'MILES (4.72 KM) TO A
JJ0211'CURVE RIGHT. CONTINUE SOUTH ON STATE HIGHWAY 287 FOR 2.23 MILES (3.59
JJ0211'KM) TO COUNTY ROAD
JJ0211'N AND THE STATION ON RIGHT. THE STATION IS SET IN THE TOP OF A 30 CM
JJ0211'SQUARE CONCRETE
JJ0211'POST PROJECTING 10 CM ABOVE GROUND. LOCATED 29.5 FEET (9.0 METERS)
JJ0211'NORTH OF THE
JJ0211'CENTERLINE OF COUNTY ROAD N, 1.47 FEET (0.45 METERS) SOUTH OF KIOWA
JJ0211'COUNTY RIGHT-OF-WAY
JJ0211'FENCE, 2.30 FEET (0.7 METERS) NORTHEAST OF A STEEL WITNESS POST, AND
JJ0211'18.0 FEET (5.5 METERS)
JJ0211'WEST OF A FENCE CORNER.

*** retrieval complete.

Elapsed Time = 00:00:04

The NGS Data Sheet

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

```

PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
JJ0680 *****
JJ0680 DESIGNATION -  N 432
JJ0680 PID          -  JJ0680
JJ0680 STATE/COUNTY-  CO/BENT
JJ0680 COUNTRY      -  US
JJ0680 USGS QUAD    -  CORNELIA (1953)
JJ0680
JJ0680                                *CURRENT SURVEY CONTROL
JJ0680
JJ0680 * NAD 83(2011) POSITION- 38 02 48.48738(N) 103 22 18.43560(W)  ADJUSTED
JJ0680 * NAD 83(2011) ELLIP HT- 1207.868 (meters)                (06/27/12)  ADJUSTED
JJ0680 * NAD 83(2011) EPOCH   - 2010.00
JJ0680 * NAVD 88 ORTHO HEIGHT - 1230.180 (meters)                4036.02 (feet) ADJUSTED
JJ0680
JJ0680 GEOID HEIGHT      -      -22.304 (meters)                GEOID12B
JJ0680 NAD 83(2011) X    - -1,163,324.238 (meters)                COMP
JJ0680 NAD 83(2011) Y    - -4,893,811.729 (meters)                COMP
JJ0680 NAD 83(2011) Z    -  3,910,280.701 (meters)                COMP
JJ0680 LAPLACE CORR      -      -2.13 (seconds)                DEFLEC12B
JJ0680 DYNAMIC HEIGHT    -      1228.959 (meters)                4032.01 (feet) COMP
JJ0680 MODELED GRAVITY    -      979,594.6 (mgal)                NAVD 88
JJ0680
JJ0680 VERT ORDER          -  FIRST      CLASS II
JJ0680
JJ0680 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
JJ0680 Standards:
JJ0680      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
JJ0680      Horiz  Ellip              SD_N   SD_E   SD_h      (unitless)
JJ0680 -----
JJ0680 NETWORK    1.47    2.41              0.67   0.51   1.23      -0.07377384
JJ0680 -----
JJ0680 Click here for local accuracies and other accuracy information.
JJ0680
JJ0680
JJ0680.The horizontal coordinates were established by GPS observations
JJ0680.and adjusted by the National Geodetic Survey in June 2012.
JJ0680
JJ0680.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
JJ0680.been affixed to the stable North American tectonic plate. See
JJ0680.NA2011 for more information.
JJ0680
JJ0680.The horizontal coordinates are valid at the epoch date displayed above
JJ0680.which is a decimal equivalence of Year/Month/Day.
JJ0680
JJ0680.The orthometric height was determined by differential leveling and
JJ0680.adjusted by the NATIONAL GEODETIC SURVEY
JJ0680.in June 1991.
JJ0680
JJ0680.Significant digits in the geoid height do not necessarily reflect accuracy.

```

JJ0680.GEOID12B height accuracy estimate available [here](#).

JJ0680

JJ0680.The X, Y, and Z were computed from the position and the ellipsoidal ht.

JJ0680

JJ0680.The Laplace correction was computed from DEFLEC12B derived deflections.

JJ0680

JJ0680.The ellipsoidal height was determined by GPS observations

JJ0680.and is referenced to NAD 83.

JJ0680

JJ0680.The dynamic height is computed by dividing the NAVD 88

JJ0680.geopotential number by the normal gravity value computed on the

JJ0680.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

JJ0680.degrees latitude (g = 980.6199 gals.).

JJ0680

JJ0680.The modeled gravity was interpolated from observed gravity values.

JJ0680

JJ0680. The following values were computed from the NAD 83(2011) position.

JJ0680

JJ0680;		North	East	Units	Scale Factor	Converg.
JJ0680;SPC CO S	-	460,102.497	1,101,184.017	MT	0.99995226	+1 18 19.4
JJ0680;SPC CO S	-	1,509,519.61	3,612,801.23	sFT	0.99995226	+1 18 19.4
JJ0680;UTM 13	-	4,212,259.093	642,866.463	MT	0.99985139	+1 00 13.1

JJ0680

JJ0680! Elev Factor x Scale Factor = Combined Factor

JJ0680!SPC CO S - 0.99981051 x 0.99995226 = 0.99976277

JJ0680!UTM 13 - 0.99981051 x 0.99985139 = 0.99966192

JJ0680

JJ0680_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SFC4286612259(NAD 83)

JJ0680

JJ0680 SUPERSEDED SURVEY CONTROL

JJ0680

JJ0680	NAD 83(2007)-	38 02 48.48732(N)	103 22 18.43605(W)	AD(2002.00)	0
JJ0680	ELLIP H (02/10/07)	1207.891 (m)		GP(2002.00)	
JJ0680	ELLIP H (12/03/02)	1207.900 (m)		GP()	4 2
JJ0680	NAD 83(1992)-	38 02 48.48693(N)	103 22 18.43593(W)	AD()	1
JJ0680	ELLIP H (04/19/01)	1207.887 (m)		GP()	4 2
JJ0680	NAVD 88	1230.18 (m)	4036.0 (f)	LEVELING	3

JJ0680

JJ0680.Superseded values are not recommended for survey control.

JJ0680

JJ0680.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

JJ0680.See file [dsdata.pdf](#) to determine how the superseded data were derived.

JJ0680

JJ0680_MARKER: I = METAL ROD

JJ0680_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL

JJ0680+WITH SETTING: INFORMATION.

JJ0680_STAMPING: N 432 1985

JJ0680_MARK LOGO: NGS

JJ0680_PROJECTION: FLUSH

JJ0680_MAGNETIC: N = NO MAGNETIC MATERIAL

JJ0680_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

JJ0680_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

JJ0680+SATELLITE: SATELLITE OBSERVATIONS - March 10, 2012

JJ0680_ROD/PIPE-DEPTH: 1.80 meters

JJ0680

JJ0680	HISTORY	- Date	Condition	Report By
JJ0680	HISTORY	- 1985	MONUMENTED	NGS
JJ0680	HISTORY	- 19990301	GOOD	NGS
JJ0680	HISTORY	- 19990520	GOOD	CODOT
JJ0680	HISTORY	- 20120310	GOOD	BOR

JJ0680

JJ0680

STATION DESCRIPTION

JJ0680

JJ0680'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985

JJ0680'14.0 KM (8.7 MI) WEST FROM LAS ANIMAS.

JJ0680'14.0 KM (8.7 MI) WESTERLY ALONG U.S. HIGHWAY 50 FROM THE COURTHOUSE IN

JJ0680'LAS ANIMAS, 2.6 KM (1.6 MI) NORTHEAST OF THE BIG TIMBERS REST AREA,

JJ0680'17.8 M (58.4 FT) NORTH-NORTHWEST OF THE CENTERLINE OF THE HIGHWAY, AND

JJ0680'0.2 M (0.7 FT) SOUTH-SOUTHEAST OF A FENCE. NOTE--ACCESS TO THE DATUM

JJ0680'POINT IS THROUGH A 5-INCH LOGO CAP.

JJ0680'THE MARK IS 0.3 METERS E FROM A WITNESS POST

JJ0680'THE MARK IS 0.5 M BELOW THE HIGHWAY.

JJ0680

JJ0680

STATION RECOVERY (1999)

JJ0680

JJ0680'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (RSC)

JJ0680'RECOVERED IN GOOD CONDITION.

JJ0680

JJ0680

STATION RECOVERY (1999)

JJ0680

JJ0680'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1999

JJ0680'DESCRIBED BY NGS 1999 (RSC)

JJ0680'THE STATION IS LOCATED ABOUT 10 MI (16.1 KM) EAST OF LA JUNTA, 6.7 MI

JJ0680'(10.8 KM)

JJ0680'WEST OF LAS ANIMAS AND 3 MI (4.8 KM) WEST-SOUTHWEST OF RIVERDALE, IN

JJ0680'THE

JJ0680'SOUTHEAST 1/4 OF SECTION 17, T 23 S, R 53 W, AT U. S. HIGHWAY 50

JJ0680'MILEPOST

JJ0680'390.32. OWNERSHIP--COLORADO DEPT. OF TRANSPORTATION RIGHT-OF-WAY

JJ0680'

JJ0680'TO REACH THE STATION FROM THE COURTHOUSE IN LAS ANIMAS, GO WEST ON U.

JJ0680'S.

JJ0680'50 FOR 8.7 MI (14.0 KM) TO THE STATION ON THE LEFT. IT IS 1.6 MI (2.6

JJ0680'KM) NORTHEAST

JJ0680'OF THE BIG TIMBERS REST AREA

JJ0680'

JJ0680'THE MARK IS A PUNCH MARK, TOP CENTER ON A 1.8 M (5.9 FT) LONG

JJ0680'STAINLESS

JJ0680'STEEL ROD DRIVEN TO REFUSAL, ENCLOSED IN A 5-INCH PVC PIPE WITH LOGO

JJ0680'LID,

JJ0680'SURROUNDED BY A CONCRETE COLLAR FLUSH WITH THE GROUND. IT IS 17.8 M

JJ0680'(58.4

JJ0680'FT) NORTH-NORTHEAST FROM THE CENTER LINE OF U. S. HIGHWAY 50, 0.2 M

JJ0680'(0.7 FT)

JJ0680'SOUTH-SOUTHEAST FROM A FENCE, 0.3 M (1.0 FT) EAST FROM A WITNESS POST

JJ0680'AND

JJ0680'ABOUT 0.5 M (1.6 FT) BELOW THE HIGHWAY.

JJ0680'

JJ0680'

JJ0680

JJ0680

STATION RECOVERY (2012)

JJ0680

JJ0680'RECOVERY NOTE BY US BUREAU OF RECLAMATION 2012 (TAC)

JJ0680'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
HJ0274 *****
HJ0274 DESIGNATION -  N 433
HJ0274 PID          -  HJ0274
HJ0274 STATE/COUNTY-  CO/PROWERS
HJ0274 COUNTRY      -  US
HJ0274 USGS QUAD    -  CAT CREEK NE (1968)
HJ0274
HJ0274                      *CURRENT SURVEY CONTROL
HJ0274
HJ0274 * NAD 83(2011) POSITION- 37 57 18.72256(N) 102 36 45.63489(W)  ADJUSTED
HJ0274 * NAD 83(2011) ELLIP HT- 1142.742 (meters)          (06/27/12)  ADJUSTED
HJ0274 * NAD 83(2011) EPOCH   - 2010.00
HJ0274 * NAVD 88 ORTHO HEIGHT - 1165.978 (meters)          3825.38 (feet) ADJUSTED
HJ0274
HJ0274 GEOID HEIGHT   -          -23.241 (meters)          GEOID12B
HJ0274 NAD 83(2011) X - -1,099,741.901 (meters)          COMP
HJ0274 NAD 83(2011) Y - -4,914,854.460 (meters)          COMP
HJ0274 NAD 83(2011) Z -   3,902,227.191 (meters)          COMP
HJ0274 LAPLACE CORR   -           -3.73 (seconds)          DEFLEC12B
HJ0274 DYNAMIC HEIGHT -           1164.838 (meters)        3821.64 (feet) COMP
HJ0274 MODELED GRAVITY -           979,611.7 (mgal)          NAVD 88
HJ0274
HJ0274 VERT ORDER     -   FIRST      CLASS II
HJ0274
HJ0274 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HJ0274 Standards:
HJ0274           FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
HJ0274           Horiz  Ellip              SD_N   SD_E   SD_h          (unitless)
HJ0274 -----
HJ0274 NETWORK      1.06   3.04              0.46   0.40   1.55          0.03666970
HJ0274 -----
HJ0274 Click here for local accuracies and other accuracy information.
HJ0274
HJ0274
HJ0274.The horizontal coordinates were established by GPS observations
HJ0274.and adjusted by the National Geodetic Survey in June 2012.
HJ0274
HJ0274.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HJ0274.been affixed to the stable North American tectonic plate. See
HJ0274.NA2011 for more information.
HJ0274
HJ0274.The horizontal coordinates are valid at the epoch date displayed above
HJ0274.which is a decimal equivalence of Year/Month/Day.
HJ0274
HJ0274.The orthometric height was determined by differential leveling and
HJ0274.adjusted by the NATIONAL GEODETIC SURVEY
HJ0274.in June 1991.
HJ0274
HJ0274.Significant digits in the geoid height do not necessarily reflect accuracy.

```

HJ0274.GEOID12B height accuracy estimate available [here](#).

HJ0274

HJ0274.The X, Y, and Z were computed from the position and the ellipsoidal ht.

HJ0274

HJ0274.The Laplace correction was computed from DEFLEC12B derived deflections.

HJ0274

HJ0274.The ellipsoidal height was determined by GPS observations

HJ0274.and is referenced to NAD 83.

HJ0274

HJ0274.The dynamic height is computed by dividing the NAVD 88

HJ0274.geopotential number by the normal gravity value computed on the

HJ0274.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

HJ0274.degrees latitude (g = 980.6199 gals.).

HJ0274

HJ0274.The modeled gravity was interpolated from observed gravity values.

HJ0274

HJ0274. The following values were computed from the NAD 83(2011) position.

HJ0274

HJ0274;		North	East	Units	Scale Factor	Converg.
HJ0274;SPC CO S	-	451,728.996	1,168,103.072	MT	0.99994762	+1 46 15.7
HJ0274;SPC CO S	-	1,482,047.55	3,832,351.50	sFT	0.99994762	+1 46 15.7
HJ0274;UTM 13	-	4,203,532.873	709,743.000	MT	1.00014186	+1 28 07.8

HJ0274

HJ0274! Elev Factor x Scale Factor = Combined Factor

HJ0274!SPC CO S - 0.99982072 x 0.99994762 = 0.99976835

HJ0274!UTM 13 - 0.99982072 x 1.00014186 = 0.99996255

HJ0274

HJ0274_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGC0974303532(NAD 83)

HJ0274

HJ0274 SUPERSEDED SURVEY CONTROL

HJ0274

HJ0274	NAD 83(2007)-	37 57 18.72249(N)	102 36 45.63562(W)	AD(2002.00)	0
HJ0274	ELLIP H (02/10/07)	1142.761 (m)		GP(2002.00)	
HJ0274	ELLIP H (12/03/02)	1142.763 (m)		GP()	4 2
HJ0274	NAD 83(1992)-	37 57 18.72235(N)	102 36 45.63506(W)	AD()	1
HJ0274	ELLIP H (04/04/97)	1142.731 (m)		GP()	4 1
HJ0274	NAVD 88 (04/04/97)	1166.0 (m)	GEOID93 model used	GPS OBS	

HJ0274

HJ0274.Superseded values are not recommended for survey control.

HJ0274

HJ0274.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

HJ0274.See file [dsdata.pdf](#) to determine how the superseded data were derived.

HJ0274

HJ0274_MARKER: I = METAL ROD

HJ0274_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

HJ0274_STAMPING: N 433 1985

HJ0274_MARK LOGO: NGS

HJ0274_PROJECTION: FLUSH

HJ0274_MAGNETIC: O = OTHER; SEE DESCRIPTION

HJ0274_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

HJ0274_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

HJ0274+SATELLITE: SATELLITE OBSERVATIONS - March 25, 1996

HJ0274_ROD/PIPE-DEPTH: 4.0 meters

HJ0274

HJ0274	HISTORY	- Date	Condition	Report By
HJ0274	HISTORY	- 1985	MONUMENTED	NGS
HJ0274	HISTORY	- 19960325	GOOD	CODOT

HJ0274

HJ0274

HJ0274

HJ0274 STATION DESCRIPTION

HJ0274

HJ0274'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985

HJ0274'14.8 KM (9.2 MI) SOUTH FROM LAMAR.

HJ0274'14.6 KM (9.2 MI) SOUTHERLY ALONG U.S. HIGHWAY 385 FROM THE COURTHOUSE
HJ0274'IN LAMAR, 1.7 KM (1.05 MI) NORTH OF THE INTERSECTION OF COUNTY ROAD X,
HJ0274'0.7 KM (0.45 MI) NORTH OF MILEPOST 68, 22.4 M (73.5 FT) EAST OF THE
HJ0274'CENTERLINE OF THE HIGHWAY, AND 2.4 M (7.9 FT) SOUTH OF A UTILITY POLE.

HJ0274'NOTE--ACCESS TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.

HJ0274'THE MARK IS 0.3 METERS W FROM A WITNESS POST AND FENCE

HJ0274'THE MARK IS 0.5 M BELOW THE HIGHWAY.

HJ0274

HJ0274

STATION RECOVERY (1996)

HJ0274

HJ0274'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1996 (JRZ)

HJ0274'RECOVERED AS DESCRIBED. FROM THE COURTHOUSE IN LAMAR, TAKE US HIGHWAY

HJ0274'385 SOUTH 14.6 KM (9.07 MI) . STATION IS 0.7 KM (0.43 MI) NORTH OF

HJ0274'MILEPOST 68, 22.4 M (73.49 FT) EAST OF OF THE CENTER OF THE HIGHWAY,

HJ0274'AND 2.4 M (7.87 FT) SOUTH OF A UTILITY PLOE. ACCESS TO THE DATUM

HJ0274'POINT IS THROUGH A 5 INCH LOGO CAP. MARK IS 0.3 M (0.98 FT) WEST OF A

HJ0274'WITNESS POST AND FENCE, AND IS 0.5 M (1.64 FT) BELOW THE HIGHWAY. THE

HJ0274'STATION WAS RECOVERED IN GOOD CONDITION IN MARCH 1996.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
HK0012 *****
HK0012 DESIGNATION - P 69
HK0012 PID - HK0012
HK0012 STATE/COUNTY- CO/LAS ANIMAS
HK0012 COUNTRY - US
HK0012 USGS QUAD - THATCHER (1993)
HK0012
HK0012 *CURRENT SURVEY CONTROL
HK0012
HK0012* NAD 83(2011) POSITION- 37 34 45.07883(N) 104 02 46.79713(W) ADJUSTED
HK0012* NAD 83(2011) ELLIP HT- 1568.274 (meters) (06/27/12) ADJUSTED
HK0012* NAD 83(2011) EPOCH - 2010.00
HK0012* NAVD 88 ORTHO HEIGHT - 1588.657 (meters) 5212.12 (feet) ADJUSTED
HK0012
HK0012 GEOID HEIGHT - -20.394 (meters) GEOID12B
HK0012 NAD 83(2011) X - -1,228,651.030 (meters) COMP
HK0012 NAD 83(2011) Y - -4,910,928.758 (meters) COMP
HK0012 NAD 83(2011) Z - 3,869,489.576 (meters) COMP
HK0012 LAPLACE CORR - -3.64 (seconds) DEFLEC12B
HK0012 DYNAMIC HEIGHT - 1586.869 (meters) 5206.25 (feet) COMP
HK0012 MODELED GRAVITY - 979,448.8 (mgal) NAVD 88
HK0012
HK0012 VERT ORDER - SECOND CLASS 0
HK0012
HK0012 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HK0012 Standards:
HK0012 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
HK0012 Horiz Ellip SD_N SD_E SD_h (unitless)
HK0012 -----
HK0012 NETWORK 1.28 2.08 0.58 0.44 1.06 0.15018465
HK0012 -----
HK0012 Click here for local accuracies and other accuracy information.
HK0012
HK0012
HK0012.The horizontal coordinates were established by GPS observations
HK0012.and adjusted by the National Geodetic Survey in June 2012.
HK0012
HK0012.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HK0012.been affixed to the stable North American tectonic plate. See
HK0012.NA2011 for more information.
HK0012
HK0012.The horizontal coordinates are valid at the epoch date displayed above
HK0012.which is a decimal equivalence of Year/Month/Day.
HK0012
HK0012.The orthometric height was determined by differential leveling and
HK0012.adjusted by the NATIONAL GEODETIC SURVEY
HK0012.in June 1991.
HK0012
HK0012.Significant digits in the geoid height do not necessarily reflect accuracy.

```

HK0012.GEOID12B height accuracy estimate available [here](#).

HK0012

HK0012.The X, Y, and Z were computed from the position and the ellipsoidal ht.

HK0012

HK0012.The Laplace correction was computed from DEFLEC12B derived deflections.

HK0012

HK0012.The ellipsoidal height was determined by GPS observations

HK0012.and is referenced to NAD 83.

HK0012

HK0012.The dynamic height is computed by dividing the NAVD 88

HK0012.geopotential number by the normal gravity value computed on the

HK0012.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

HK0012.degrees latitude (g = 980.6199 gals.).

HK0012

HK0012.The modeled gravity was interpolated from observed gravity values.

HK0012

HK0012. The following values were computed from the NAD 83(2011) position.

HK0012

HK0012;	North	East	Units	Scale Factor	Converg.
HK0012;SPC CO S	- 407,074.588	1,042,796.223	MT	0.99995525	+0 53 29.9
HK0012;SPC CO S	- 1,335,543.88	3,421,240.61	sFT	0.99995525	+0 53 29.9
HK0012;UTM 13	- 4,159,554.196	584,206.644	MT	0.99968734	+0 34 53.9

HK0012

HK0012! Elev Factor x Scale Factor = Combined Factor

HK0012!SPC CO S - 0.99975396 x 0.99995525 = 0.99970923

HK0012!UTM 13 - 0.99975396 x 0.99968734 = 0.99944138

HK0012

HK0012_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SEB8420659554(NAD 83)

HK0012

HK0012 SUPERSEDED SURVEY CONTROL

HK0012

HK0012	NAD 83(2007)-	37 34 45.07881(N)	104 02 46.79752(W)	AD(2002.00)	0
HK0012	ELLIP H (02/10/07)	1568.295 (m)		GP(2002.00)	
HK0012	ELLIP H (10/21/02)	1568.282 (m)		GP()	5 1
HK0012	NAD 83(1992)-	37 34 45.07899(N)	104 02 46.79705(W)	AD()	1
HK0012	ELLIP H (06/30/00)	1568.316 (m)		GP()	1 1
HK0012	ELLIP H (12/21/93)	1568.297 (m)		GP()	4 1
HK0012	NAD 83(1992)-	37 34 45.07961(N)	104 02 46.80066(W)	AD()	1
HK0012	ELLIP H (01/07/93)	1568.297 (m)		GP()	4 2
HK0012	NAD 83(1986)-	37 34 45.06442(N)	104 02 46.80704(W)	AD()	1
HK0012	NAD 27	- 37 34 45.02829(N)	104 02 44.90927(W)	AD()	1
HK0012	NAVD 88	1588.66 (m)	5212.1 (f)	LEVELING	3
HK0012	NGVD 29 (??/??/92)	1587.800 (m)	5209.31 (f)	ADJ UNCH	2 0
HK0012	NGVD 29	1587.80 (m)	5209.3 (f)	LEVELING	3

HK0012

HK0012.Superseded values are not recommended for survey control.

HK0012

HK0012.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

HK0012.See file [dsdata.pdf](#) to determine how the superseded data were derived.

HK0012

HK0012_MARKER: DB = BENCH MARK DISK

HK0012_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

HK0012_STAMPING: P 69 1934

HK0012_MARK LOGO: CGS

HK0012_MAGNETIC: N = NO MAGNETIC MATERIAL

HK0012_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

HK0012+STABILITY: SURFACE MOTION

HK0012_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

HK0012+SATELLITE: SATELLITE OBSERVATIONS - May 24, 1999

HK0012

HK0012	HISTORY	- Date	Condition	Report By
HK0012	HISTORY	- 1934	MONUMENTED	CGS
HK0012	HISTORY	- 1985	GOOD	NGS
HK0012	HISTORY	- 19860520	GOOD	
HK0012	HISTORY	- 19990423	GOOD	MSAM
HK0012	HISTORY	- 19990524	GOOD	CODOT

HK0012

HK0012

STATION DESCRIPTION

HK0012

HK0012'DESCRIBED BY COAST AND GEODETIC SURVEY 1934

HK0012'0.3 MI SW FROM THATCHER.

HK0012'ABOUT 0.3 MILE SOUTHWEST ALONG THE ATCHISON, TOPEKA AND SANTA FE

HK0012'RAILWAY FROM THE STATION AT WEST, LAS ANIMAS COUNTY, ABOUT 8

HK0012'POLES NORTHEAST OF MILEPOST 596, ABOUT 99 FEET SOUTHEAST OF THE

HK0012'CENTER LINE OF THE TRACK, 25 FEET SOUTHEAST OF A POLE, AND 1 FOOT

HK0012'NORTHWEST OF THE FENCE, A STANDARD DISK, STAMPED P 69 1934 AND

HK0012'SET IN THE TOP OF A CONCRETE POST.

HK0012

HK0012

STATION RECOVERY (1985)

HK0012

HK0012'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1985

HK0012'A NEW DESC: ABOUT 0.5 KM (0.3 MI) SOUTHWEST ALONG THE ATCHISON,

HK0012'TOPEKA, AND SANTA FE RAILWAY FROM THE STATION AT WEST, LAS ANIMAS

HK0012'COUNTY, ABOUT 8 POLES NORTHEAST OF MILEPOST 596, 31.7 M (104 FT)

HK0012'SOUTHEAST OF THE CENTER OF THE TRACK, 39.6 M (130 FT) WEST-NORTHWEST

HK0012'OF THE CENTER LINE OF U.S. HIGHWAY 350, AND 1.8 M (6 FT) SOUTHWEST OF

HK0012'A FENCE CORNER.

HK0012

HK0012

STATION RECOVERY (1986)

HK0012

HK0012'RECOVERED 1986

HK0012'RECOVERED IN GOOD CONDITION.

HK0012

HK0012

STATION RECOVERY (1999)

HK0012

HK0012'RECOVERY NOTE BY MOUNTAIN SURVEYING AND MAPPING INC 1999 (KCH)

HK0012'RECOVERED AS DESCRIBED.

HK0012

HK0012

STATION RECOVERY (1999)

HK0012

HK0012'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1999

HK0012'DESCRIBED BY NGS 1999 (RSC)

HK0012'THE STATION IS LOCATED ABOUT 39 MI (62.8 KM) NORTHEAST OF TRINIDAD,

HK0012'4.5 MI

HK0012'(7.2 KM) SOUTHWEST OF DELHI AND 4 MI (6.4 KM) NORTHEAST OF THATCHER,

HK0012'IN THE

HK0012'SOUTHWEST 1/4 OF SECTION 30, T 28 S, R 59 W, AT U. S. HIGHWAY 350

HK0012'MILEPOST 32.5.

HK0012'OWNERSHIP--BURLINGTON NORTHERN AND SANTA FE RAILROAD RIGHT-OF-WAY

HK0012'

HK0012'TO REACH THE STATION FROM THE DELHI STORE IN DELHI, GO SOUTHWEST ON

HK0012'U. S. HIGHWAY 350 FOR 4.72 MI (7.60 KM) TO A SIDE ROAD RIGHT. TURN

HK0012'RIGHT,

HK0012'NORTHWEST, ON THE SOUTHEASTERN ACCESS DIRT ROAD FOR THE RAILROAD,

HK0012'0.05 MI (0.08 KM) TO THE STATION ON THE RIGHT AT A FENCE CORNER

HK0012'

HK0012'THE MARK IS A DISK SET INTO THE TOP OF A SQUARE 30 CM CONCRETE POST

HK0012'PROJECTING 12 CM ABOVE THE GROUND. IT IS 31.7 M (104.0 FT) SOUTHEAST

HK0012'FROM

HK0012'THE CENTER OF A TRACK ROAD, 39.6 M (129.9 FT) WEST-NORTHWEST FROM THE

HK0012'CENTER LINE OF THE HIGHWAY, 27.5 M (90.2 FT) WEST FROM A FENCE CORNER,
HK0012'7.7 M
HK0012'(25.3 FT) EAST FROM A TELEPHONE POLE, 1.8 M (5.9 FT) SOUTHWEST FROM A
HK0012'FENCE
HK0012'CORNER, 0.6 M (2.0 FT) SOUTH FROM A WITNESS POST AND ABOUT 1 M (3.3
HK0012'FT) BELOW
HK0012'THE HIGHWAY.
HK0012'
HK0012'

*** retrieval complete.
Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
JJ0677 *****
JJ0677 DESIGNATION - R 432
JJ0677 PID - JJ0677
JJ0677 STATE/COUNTY- CO/BENT
JJ0677 COUNTRY - US
JJ0677 USGS QUAD - CORNELIA (1953)
JJ0677
JJ0677 *CURRENT SURVEY CONTROL
JJ0677
JJ0677* NAD 83(1986) POSITION- 38 03 42. (N) 103 15 43. (W) SCALED
JJ0677* NAVD 88 ORTHO HEIGHT - 1193.942 (meters) 3917.12 (feet) ADJUSTED
JJ0677
JJ0677 GEOID HEIGHT - -22.478 (meters) GEOID12B
JJ0677 DYNAMIC HEIGHT - 1192.766 (meters) 3913.27 (feet) COMP
JJ0677 MODELED GRAVITY - 979,602.9 (mgal) NAVD 88
JJ0677
JJ0677 VERT ORDER - FIRST CLASS II
JJ0677
JJ0677.The horizontal coordinates were scaled from a topographic map and have
JJ0677.an estimated accuracy of +/- 6 seconds.
JJ0677.
JJ0677.The orthometric height was determined by differential leveling and
JJ0677.adjusted by the NATIONAL GEODETIC SURVEY
JJ0677.in June 1991.
JJ0677
JJ0677.Significant digits in the geoid height do not necessarily reflect accuracy.
JJ0677.GEOID12B height accuracy estimate available here.
JJ0677
JJ0677.The dynamic height is computed by dividing the NAVD 88
JJ0677.geopotential number by the normal gravity value computed on the
JJ0677.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
JJ0677.degrees latitude (g = 980.6199 gals.).
JJ0677
JJ0677.The modeled gravity was interpolated from observed gravity values.
JJ0677
JJ0677; North East Units Estimated Accuracy
JJ0677;SPC CO S - 461,980. 1,110,780. MT (+/- 180 meters Scaled)
JJ0677
JJ0677_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SFC524140(NAD 83)
JJ0677
JJ0677 SUPERSEDED SURVEY CONTROL
JJ0677
JJ0677.No superseded survey control is available for this station.
JJ0677
JJ0677_MARKER: I = METAL ROD
JJ0677_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
JJ0677_STAMPING: R 432 1985
JJ0677_MARK LOGO: NGS
JJ0677_PROJECTION: FLUSH

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JJ0677_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

JJ0677_ROD/PIPE-DEPTH: 9.8 meters

JJ0677

JJ0677	HISTORY	- Date	Condition	Report By
--------	---------	--------	-----------	-----------

JJ0677	HISTORY	- 1985	MONUMENTED	NGS
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JJ0677

JJ0677

STATION DESCRIPTION

JJ0677

JJ0677'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985

JJ0677'4.0 KM (2.5 MI) WEST FROM LAS ANIMAS.

JJ0677'4.0 KM (2.5 MI) WESTERLY ALONG U.S. HIGHWAY 50 FROM THE COURTHOUSE IN

JJ0677'LAS ANIMAS, 44.7 M (146.7 FT) WEST OF THE CENTER OF COUNTY ROAD 8.50,

JJ0677'17.8 M (58.4 FT) NORTH OF THE CENTERLINE OF THE HIGHWAY, 10.2 M

JJ0677'(33.5 FT) SOUTH OF THE NEAR RAIL OF THE SANTA FE RAILROAD, AND 1.7 M

JJ0677'(5.6 FT) NORTH OF A UTILITY POLE WITH TWO GUY WIRES. NOTE--ACCESS TO

JJ0677'THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP.

JJ0677'THE MARK IS 0.3 METERS S FROM A WITNESS POST

*** retrieval complete.

Elapsed Time = 00:00:03

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
HJ0239 *****
HJ0239 DESIGNATION - R 435
HJ0239 PID - HJ0239
HJ0239 STATE/COUNTY- CO/BACA
HJ0239 COUNTRY - US
HJ0239 USGS QUAD - BISONTE (1978)
HJ0239
HJ0239 *CURRENT SURVEY CONTROL
HJ0239
HJ0239 * NAD 83(2011) POSITION- 37 22 02.70873(N) 102 36 54.32586(W) ADJUSTED
HJ0239 * NAD 83(2011) ELLIP HT- 1325.696 (meters) (06/27/12) ADJUSTED
HJ0239 * NAD 83(2011) EPOCH - 2010.00
HJ0239 * NAVD 88 ORTHO HEIGHT - 1348.832 (meters) 4425.29 (feet) ADJUSTED
HJ0239
HJ0239 GEOID HEIGHT - -23.118 (meters) GEOID12B
HJ0239 NAD 83(2011) X - -1,108,687.682 (meters) COMP
HJ0239 NAD 83(2011) Y - -4,953,854.482 (meters) COMP
HJ0239 NAD 83(2011) Z - 3,850,684.468 (meters) COMP
HJ0239 LAPLACE CORR - -4.70 (seconds) DEFLEC12B
HJ0239 DYNAMIC HEIGHT - 1347.400 (meters) 4420.59 (feet) COMP
HJ0239 MODELED GRAVITY - 979,521.5 (mgal) NAVD 88
HJ0239
HJ0239 VERT ORDER - FIRST CLASS II
HJ0239
HJ0239 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
HJ0239 Standards:
HJ0239 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
HJ0239 Horiz Ellip SD_N SD_E SD_h (unitless)
HJ0239 -----
HJ0239 NETWORK 1.95 2.31 0.87 0.70 1.18 0.13157662
HJ0239 -----
HJ0239 Click here for local accuracies and other accuracy information.
HJ0239
HJ0239
HJ0239 .The horizontal coordinates were established by GPS observations
HJ0239 .and adjusted by the National Geodetic Survey in June 2012.
HJ0239
HJ0239 .NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
HJ0239 .been affixed to the stable North American tectonic plate. See
HJ0239 NA2011 for more information.
HJ0239
HJ0239 .The horizontal coordinates are valid at the epoch date displayed above
HJ0239 .which is a decimal equivalence of Year/Month/Day.
HJ0239
HJ0239 .The orthometric height was determined by differential leveling and
HJ0239 .adjusted by the NATIONAL GEODETIC SURVEY
HJ0239 .in June 1991.
HJ0239
HJ0239 .Significant digits in the geoid height do not necessarily reflect accuracy.

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HJ0239.GEOID12B height accuracy estimate available [here](#).

HJ0239

HJ0239.The X, Y, and Z were computed from the position and the ellipsoidal ht.

HJ0239

HJ0239.The Laplace correction was computed from DEFLEC12B derived deflections.

HJ0239

HJ0239.The ellipsoidal height was determined by GPS observations

HJ0239.and is referenced to NAD 83.

HJ0239

HJ0239.The dynamic height is computed by dividing the NAVD 88

HJ0239.geopotential number by the normal gravity value computed on the

HJ0239.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

HJ0239.degrees latitude (g = 980.6199 gals.).

HJ0239

HJ0239.The modeled gravity was interpolated from observed gravity values.

HJ0239

HJ0239. The following values were computed from the NAD 83(2011) position.

HJ0239

HJ0239;		North	East	Units	Scale Factor	Converg.
HJ0239;SPC CO S	-	386,518.604	1,169,905.430	MT	0.99997837	+1 46 10.3
HJ0239;SPC CO S	-	1,268,103.12	3,838,264.73	sFT	0.99997837	+1 46 10.3
HJ0239;UTM 13	-	4,138,301.157	711,190.681	MT	1.00014943	+1 26 52.8

HJ0239

HJ0239! - Elev Factor x Scale Factor = Combined Factor

HJ0239!SPC CO S - 0.99979201 x 0.99997837 = 0.99977038

HJ0239!UTM 13 - 0.99979201 x 1.00014943 = 0.99994141

HJ0239

HJ0239_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGB1119038301(NAD 83)

HJ0239

HJ0239 SUPERSEDED SURVEY CONTROL

HJ0239

HJ0239	NAD 83(2007)-	37 22 02.70870(N)	102 36 54.32651(W)	AD(2002.00)	0
HJ0239	ELLIP H (02/10/07)	1325.717 (m)		GP(2002.00)	
HJ0239	ELLIP H (12/03/02)	1325.711 (m)		GP()	4 2
HJ0239	NAD 83(1986)-	37 22 02.70853(N)	102 36 54.32621(W)	AD()	1
HJ0239	ELLIP H (08/11/94)	1325.732 (m)		GP()	3 2

HJ0239

HJ0239.Superseded values are not recommended for survey control.

HJ0239

HJ0239.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

HJ0239.See file [dsdata.pdf](#) to determine how the superseded data were derived.

HJ0239

HJ0239_MARKER: I = METAL ROD

HJ0239_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

HJ0239_STAMPING: R 435 1985

HJ0239_MARK LOGO: NGS

HJ0239_PROJECTION: FLUSH

HJ0239_MAGNETIC: I = MARKER IS A STEEL ROD

HJ0239_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

HJ0239_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

HJ0239+SATELLITE: SATELLITE OBSERVATIONS - August 13, 1997

HJ0239_ROD/PIPE-DEPTH: 6.7 meters

HJ0239

HJ0239	HISTORY	- Date	Condition	Report By
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HJ0239	HISTORY	- 1985	MONUMENTED	NGS
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HJ0239	HISTORY	- 19931207	GOOD	
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HJ0239	HISTORY	- 19940207	GOOD	CODOT
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HJ0239	HISTORY	- 19970813	GOOD	CODOT
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HJ0239

HJ0239 STATION DESCRIPTION

HJ0239

HJ0239'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985

HJ0239'4.4 KM (2.75 MI) SOUTH FROM SPRINGFIELD.

HJ0239'4.4 KM (2.75 MI) SOUTHERLY ALONG U.S. HIGHWAY 385 FROM THE COURTHOUSE

HJ0239'IN SPRINGFIELD, 0.5 KM (0.3 MI) SOUTH OF MILEPOST 28, 41.5 M (136.2

HJ0239'FT) SOUTHEAST OF THE CENTER OF A GATE, 36.6 M (120.1 FT) SOUTH OF THE

HJ0239'CENTER OF A DRIVEWAY LEADING WEST, 32.3 M (106.0 FT) WEST OF THE

HJ0239'CENTERLINE OF THE HIGHWAY, AND 3.2 M (10.5 FT) NORTHWEST OF A FENCE

HJ0239'CORNER. NOTE--ACCESS TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.

HJ0239'THE MARK IS 0.3 METERS NE FROM A WITNESS POST AND FENCE

HJ0239'THE MARK IS ABOVE LEVEL WITH THE HIGHWAY.

HJ0239

HJ0239

STATION RECOVERY (1993)

HJ0239

HJ0239'RECOVERED 1993

HJ0239'RECOVERED IN GOOD CONDITION.

HJ0239

HJ0239

STATION RECOVERY (1994)

HJ0239

HJ0239'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1994

HJ0239'RECOVERED IN GOOD CONDITION.

HJ0239

HJ0239

STATION RECOVERY (1997)

HJ0239

HJ0239'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1997 (PGG)

HJ0239'RECOVERED AS DESCRIBED.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

```

PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
JJ0707 *****
JJ0707 DESIGNATION - Y 439
JJ0707 PID - JJ0707
JJ0707 STATE/COUNTY- CO/PROWERS
JJ0707 COUNTRY - US
JJ0707 USGS QUAD - LAMAR EAST (1979)
JJ0707
JJ0707 *CURRENT SURVEY CONTROL
JJ0707
JJ0707* NAD 83(2011) POSITION- 38 05 35.55910(N) 102 31 12.50687(W) ADJUSTED
JJ0707* NAD 83(2011) ELLIP HT- 1065.051 (meters) (06/27/12) ADJUSTED
JJ0707* NAD 83(2011) EPOCH - 2010.00
JJ0707* NAVD 88 ORTHO HEIGHT - 1088.472 (meters) 3571.10 (feet) ADJUSTED
JJ0707
JJ0707 GEOID HEIGHT - -23.410 (meters) GEOID12B
JJ0707 NAD 83(2011) X - -1,089,743.498 (meters) COMP
JJ0707 NAD 83(2011) Y - -4,907,351.005 (meters) COMP
JJ0707 NAD 83(2011) Z - 3,914,248.744 (meters) COMP
JJ0707 LAPLACE CORR - -2.10 (seconds) DEFLEC12B
JJ0707 DYNAMIC HEIGHT - 1087.440 (meters) 3567.71 (feet) COMP
JJ0707 MODELED GRAVITY - 979,644.3 (mgal) NAVD 88
JJ0707
JJ0707 VERT ORDER - FIRST CLASS II
JJ0707
JJ0707 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
JJ0707 Standards:
JJ0707 FGDC (95% conf, cm) Standard deviation (cm) CorrNE
JJ0707 Horiz Ellip SD_N SD_E SD_h (unitless)
JJ0707 -----
JJ0707 NETWORK 1.40 3.08 0.60 0.54 1.57 0.00584000
JJ0707 -----
JJ0707 Click here for local accuracies and other accuracy information.
JJ0707
JJ0707
JJ0707.The horizontal coordinates were established by GPS observations
JJ0707.and adjusted by the National Geodetic Survey in June 2012.
JJ0707
JJ0707.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
JJ0707.been affixed to the stable North American tectonic plate. See
JJ0707.NA2011 for more information.
JJ0707
JJ0707.The horizontal coordinates are valid at the epoch date displayed above
JJ0707.which is a decimal equivalence of Year/Month/Day.
JJ0707
JJ0707.The orthometric height was determined by differential leveling and
JJ0707.adjusted by the NATIONAL GEODETIC SURVEY
JJ0707.in June 1991.
JJ0707
JJ0707.Significant digits in the geoid height do not necessarily reflect accuracy.

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JJ0707.GEOID12B height accuracy estimate available [here](#).

JJ0707

JJ0707.The X, Y, and Z were computed from the position and the ellipsoidal ht.

JJ0707

JJ0707.The Laplace correction was computed from DEFLEC12B derived deflections.

JJ0707

JJ0707.The ellipsoidal height was determined by GPS observations

JJ0707.and is referenced to NAD 83.

JJ0707

JJ0707.The dynamic height is computed by dividing the NAVD 88

JJ0707.geopotential number by the normal gravity value computed on the

JJ0707.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

JJ0707.degrees latitude (g = 980.6199 gals.).

JJ0707

JJ0707.The modeled gravity was interpolated from observed gravity values.

JJ0707

JJ0707. The following values were computed from the NAD 83(2011) position.

JJ0707

JJ0707;		North	East	Units	Scale Factor	Converg.
JJ0707;SPC CO S	-	467,294.509	1,175,742.632	MT	0.99995559	+1 49 40.0
JJ0707;SPC CO S	-	1,533,115.40	3,857,415.62	sFT	0.99995559	+1 49 40.0
JJ0707;UTM 13	-	4,219,061.482	717,465.514	MT	1.00018248	+1 31 49.9

JJ0707

JJ0707! Elev Factor x Scale Factor = Combined Factor

JJ0707!SPC CO S - 0.99983291 x 0.99995559 = 0.99978851

JJ0707!UTM 13 - 0.99983291 x 1.00018248 = 1.00001536

JJ0707

JJ0707_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGC1746519061(NAD 83)

JJ0707

SUPERSEDED SURVEY CONTROL

JJ0707

JJ0707	NAD 83(2007)-	38 05 35.55910(N)	102 31 12.50752(W)	AD(2002.00)	0
JJ0707	ELLIP H (02/10/07)	1065.071 (m)		GP(2002.00)	
JJ0707	ELLIP H (12/03/02)	1065.082 (m)		GP()	4 2
JJ0707	NAD 83(1992)-	38 05 35.55891(N)	102 31 12.50669(W)	AD()	1
JJ0707	ELLIP H (04/04/97)	1065.051 (m)		GP()	4 1
JJ0707	NAVD 88 (04/04/97)	1088.5 (m)	GEOID93 model used	GPS OBS	

JJ0707

JJ0707.Superseded values are not recommended for survey control.

JJ0707

JJ0707.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

JJ0707.See file [dsdata.pdf](#) to determine how the superseded data were derived.

JJ0707

JJ0707_MARKER: I = METAL ROD

JJ0707_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

JJ0707_STAMPING: Y 439 1986

JJ0707_MARK LOGO: NGS

JJ0707_PROJECTION: FLUSH

JJ0707_MAGNETIC: O = OTHER; SEE DESCRIPTION

JJ0707_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

JJ0707_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

JJ0707+SATELLITE: SATELLITE OBSERVATIONS - March 27, 1996

JJ0707_ROD/PIPE-DEPTH: 5.2 meters

JJ0707

JJ0707	HISTORY	- Date	Condition	Report By
JJ0707	HISTORY	- 1986	MONUMENTED	NGS
JJ0707	HISTORY	- 19960327	GOOD	CODOT
JJ0707	HISTORY	- 20040927	GOOD	LOCENG

JJ0707

JJ0707

JJ0707

JJ0707

JJ0707

STATION DESCRIPTION

JJ0707

JJ0707'DESCRIBED BY NATIONAL GEODETIC SURVEY 1986

JJ0707'9.1 KM (5.65 MI) EAST FROM LAMAR.

JJ0707'9.0 KM (5.6 MI) EAST ALONG US HIGHWAY 50 FROM THE JUNCTION OF MAIN
JJ0707'STREET AT LAMAR, THENCE 0.08 KM (0.05 MI) NORTH ALONG ROAD 13, AT
JJ0707'RAILROAD MILEPOLE 497 OF THE ATCHISON, TOPEKA AND SANTA FE RAILROAD,
JJ0707'46.3 METERS (152 FT) WEST OF THE CENTER OF THE ROAD, 29.8 METERS (97.9
JJ0707'FT) NORTH OF THE NORTH RAIL, 3.4 METERS (11 FT) NORTH OF THE CENTER OF
JJ0707'A TRACK ROAD AND 0.9 METER (3 FT) EAST OF A POWER POLE. NOTE--ACCESS
JJ0707'TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.

JJ0707'THE MARK IS 0.3 METERS W FROM A WITNESS POST

JJ0707'THE MARK IS ABOVE LEVEL WITH THE TRACK ROAD.

JJ0707

JJ0707

STATION RECOVERY (1996)

JJ0707

JJ0707'RECOVERY NOTE BY COLORADO DEPARTMENT OF TRANSPORTATION 1996 (JRZ)

JJ0707'RECOVERED AS DESCRIBED. FROM THE JUNCTION OF MAIN STREET AND US
JJ0707'HIGHWAY 50 IN LAMAR, TAKE US HIGHWAY 50 EAST 9.0 KM (5.59 MI) TO ROAD
JJ0707'13. TURN NORTH ON ROAD 13 AND GO 0.08 KM (0.05 MI) TO RAILROAD
JJ0707'MILEPOLE 497 OF THE ATCHISON, TOPEKA AND SANTA FE RAILROAD. STSTION
JJ0707'IS 46.3 M (151.90 FT) WEST OF THE CENTER OF THE ROAD, 29.8 M (97.77
JJ0707'FT) NORTH OF THE NORTH RAIL, 3.4 M (11.15 FT) NORTH OF THE CENTER OF A
JJ0707'TRACK ROAD, 0.9 M (2.95 FT) EAST OF A POWER POLE, AND .03 M (0.10 FT)
JJ0707'WEST OF A WITNESS POST. ACCESS TO THE DATUM POINT IS THROUGH A 5 INCH
JJ0707'LOGO CAP. THE STATION IS ABOVE THE LEVEL OF THE TRACK ROAD. THE
JJ0707'STATION WAS RECOVERED IN GOOD CONDITION IN MARCH 1996.

JJ0707

JJ0707

STATION RECOVERY (2004)

JJ0707

JJ0707'RECOVERY NOTE BY LOCAL ENGINEER (INDIVIDUAL OR FIRM) 2004 (MFM)

JJ0707'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:04

The NGS Data Sheet

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

```

PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER  3, 2019
JJ0658 *****
JJ0658 DESIGNATION -  Z 432
JJ0658 PID          -  JJ0658
JJ0658 STATE/COUNTY-  CO/PROWERS
JJ0658 COUNTRY      -  US
JJ0658 USGS QUAD    -  LAMAR WEST (1979)
JJ0658
JJ0658                      *CURRENT SURVEY CONTROL
JJ0658
JJ0658* NAD 83(2011) POSITION- 38 05 06.59709(N) 102 37 57.54342(W) NO CHECK
JJ0658* NAD 83(2011) ELLIP HT- 1080.619 (meters) (06/27/12) NO CHECK
JJ0658* NAD 83(2011) EPOCH   - 2010.00
JJ0658* NAVD 88 ORTHO HEIGHT - 1103.880 (meters) 3621.65 (feet) ADJUSTED
JJ0658
JJ0658 GEOID HEIGHT      -      -23.260 (meters) GEOID12B
JJ0658 NAD 83(2011) X    - -1,099,500.996 (meters) COMP
JJ0658 NAD 83(2011) Y    - -4,905,751.226 (meters) COMP
JJ0658 NAD 83(2011) Z    -  3,913,555.407 (meters) COMP
JJ0658 LAPLACE CORR      -      -2.88 (seconds) DEFLEC12B
JJ0658 DYNAMIC HEIGHT    -      1102.824 (meters) 3618.18 (feet) COMP
JJ0658 MODELED GRAVITY    -      979,634.8 (mgal) NAVD 88
JJ0658
JJ0658 VERT ORDER        -  FIRST      CLASS II
JJ0658
JJ0658 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
JJ0658 Standards:
JJ0658      FGDC (95% conf, cm)      Standard deviation (cm)      CorrNE
JJ0658      Horiz  Ellip              SD_N  SD_E  SD_h      (unitless)
JJ0658 -----
JJ0658 NETWORK      2.57  2.70              0.80  1.20  1.38      0.26521476
JJ0658 -----
JJ0658 Click here for local accuracies and other accuracy information.
JJ0658
JJ0658
JJ0658.The horizontal coordinates were established by GPS observations
JJ0658.and adjusted by the National Geodetic Survey in June 2012.
JJ0658
JJ0658.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
JJ0658.been affixed to the stable North American tectonic plate. See
JJ0658.NA2011 for more information.
JJ0658
JJ0658.The horizontal coordinates are valid at the epoch date displayed above
JJ0658.which is a decimal equivalence of Year/Month/Day.
JJ0658
JJ0658.No horizontal observational check was made to the station.
JJ0658.
JJ0658.The orthometric height was determined by differential leveling and
JJ0658.adjusted by the NATIONAL GEODETIC SURVEY
JJ0658.in June 1991.

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JJ0658

JJ0658.Significant digits in the geoid height do not necessarily reflect accuracy.
 JJ0658.GEOID12B height accuracy estimate available [here](#).

JJ0658

JJ0658.The X, Y, and Z were computed from the position and the ellipsoidal ht.

JJ0658

JJ0658.The Laplace correction was computed from DEFLEC12B derived deflections.

JJ0658

JJ0658.The ellipsoidal height was determined by GPS observations

JJ0658.and is referenced to NAD 83.

JJ0658

JJ0658.The dynamic height is computed by dividing the NAVD 88

JJ0658.geopotential number by the normal gravity value computed on the

JJ0658.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

JJ0658.degrees latitude (g = 980.6199 gals.).

JJ0658

JJ0658.The modeled gravity was interpolated from observed gravity values.

JJ0658

JJ0658. The following values were computed from the NAD 83(2011) position.

JJ0658

JJ0658;	North	East	Units	Scale Factor	Converg.
JJ0658;SPC CO S	- 466,093.151	1,165,905.787	MT	0.99995496	+1 45 31.6
JJ0658;SPC CO S	- 1,529,173.95	3,825,142.57	sFT	0.99995496	+1 45 31.6
JJ0658;UTM 13	- 4,217,911.007	707,620.581	MT	1.00013093	+1 27 38.8

JJ0658

JJ0658! - Elev Factor x Scale Factor = Combined Factor

JJ0658!SPC CO S - 0.99983047 x 0.99995496 = 0.99978543

JJ0658!UTM 13 - 0.99983047 x 1.00013093 = 0.99996137

JJ0658

JJ0658_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGC0762017911(NAD 83)

JJ0658

JJ0658 SUPERSEDED SURVEY CONTROL

JJ0658

JJ0658	NAD 83(2007)-	38 05 06.59706(N)	102 37 57.54401(W)	AD(2002.00)	0
JJ0658	ELLIP H (02/10/07)	1080.640 (m)		GP(2002.00)	
JJ0658	ELLIP H (10/21/02)	1080.654 (m)		GP()	5 1
JJ0658	NAD 83(1992)-	38 05 06.59696(N)	102 37 57.54335(W)	AD()	1
JJ0658	ELLIP H (06/30/00)	1080.616 (m)		GP()	1 1
JJ0658	NAVD 88	1103.88 (m)	3621.6	(f) LEVELING	3

JJ0658

JJ0658.Superseded values are not recommended for survey control.

JJ0658

JJ0658.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

JJ0658.See file [dsdata.pdf](#) to determine how the superseded data were derived.

JJ0658

JJ0658_MARKER: I = METAL ROD

JJ0658_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

JJ0658_STAMPING: Z 432 1985

JJ0658_MARK LOGO: NGS

JJ0658_PROJECTION: FLUSH

JJ0658_MAGNETIC: I = MARKER IS A STEEL ROD

JJ0658_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

JJ0658_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

JJ0658+SATELLITE: SATELLITE OBSERVATIONS - April 19, 1999

JJ0658_ROD/PIPE-DEPTH: 5.5 meters

JJ0658

JJ0658	HISTORY	- Date	Condition	Report By
JJ0658	HISTORY	- 1985	MONUMENTED	NGS
JJ0658	HISTORY	- 19990419	GOOD	NGS

JJ0658

JJ0658 STATION DESCRIPTION
JJ0658
JJ0658'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985
JJ0658'IN LAMAR.
JJ0658'IN LAMAR, AT THE INTERSECTION OF OAK AND FOURTEENTH STREETS, 106.8 M
JJ0658'(350.4 FT) WEST OF THE CENTER OF THE STREET, 19.3 M (63.3 FT) SOUTH OF
JJ0658'THE CENTER OF THE STREET, 3.6 M (11.8 FT) WEST OF UTILITY POLE NUMBER
JJ0658'1119, AND 0.4 M (1.3 FT) EAST OF A FENCE CORNER. NOTE--ACCESS TO THE
JJ0658'DATUM POINT IS THROUGH A 5-INCH LOGO CAP.
JJ0658'THE MARK IS 0.3 METERS S FROM A WITNESS POST
JJ0658'THE MARK IS 1.0 M BELOW THE STREET.
JJ0658
JJ0658 STATION RECOVERY (1999)
JJ0658
JJ0658'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (RSC)
JJ0658'THE STATION IS LOCATED ABOUT 3.2 MI (5.1 KM) EAST-NORTHEAST OF THE
JJ0658'AIRPORT, 1.6 MI (2.6 KM) SOUTHEAST OF THE LAMAR CANAL DIVERSION DAM
JJ0658'AND 0.7 MI (1.1 KM) WEST OF LAMAR, IN THE NORTHEAST 1/4 OF SECTION 1,
JJ0658'T 23 S, R 47 W. OWNERSHIP--PROWERS COUNTY ROAD RIGHT-OF-WAY
JJ0658'TO REACH THE STATION FROM THE INTERSECTION OF OAK STREET (COUNTY ROAD
JJ0658'HH) AND MAIN STREET (U.S. HIGHWAY 287) IN LAMAR, GO WEST ON OAK
JJ0658'STREET FOR 0.7 MI (1.1 KM) TO THE STATION ON THE LEFT, AT THE CITY
JJ0658'LIMIT SIGN
JJ0658'THE MARK IS A PUNCH HOLE, TOP CENTER ON A STAINLESS STEEL ROAD DRIVEN
JJ0658'TO REFUSAL, ENCLOSED IN A 5-INCH PVC PIPE WITH LOGO LID, SURROUNDED BY
JJ0658'A CONCRETE COLLAR FLUSH WITH THE GROUND. IT IS 106.8 M (350.4 FT)
JJ0658'WEST FROM THE CENTER OF FOURTEENTH STREET, 19.3 M (63.3 FT) SOUTH FROM
JJ0658'THE CENTER OF OAK STREET, 12.5 M (41.0 FT) SOUTH FROM THE LAMAR CITY
JJ0658'LIMIT SIGN, 9.6 M (31.5 FT) NORTH FROM A POWER POLE WITH GUY WIRE, 3.6
JJ0658'M (11.8 FT) WEST FROM A UTILITY POLE NUMBER 1119, 0.55 M (1.80 FT)
JJ0658'EAST FROM A FENCE CORNER, 0.3 M (1.0 FT) SOUTH FROM A WITNESS POST AND
JJ0658'ABOUT 1 M (3.3 FT) BELOW THE STREET.

*** retrieval complete.
Elapsed Time = 00:00:05

The NGS Data Sheet

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

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PROGRAM = datasheet95, VERSION = 8.12.5.3.2
1      National Geodetic Survey,  Retrieval Date = SEPTEMBER 3, 2019
AE4822 *****
AE4822 DESIGNATION - Z 441
AE4822 PID - AE4822
AE4822 STATE/COUNTY- CO/PROWERS
AE4822 COUNTRY - US
AE4822 USGS QUAD - DURKEE CREEK NE (1966)
AE4822
AE4822 *CURRENT SURVEY CONTROL
AE4822
AE4822 *-----*
AE4822* NAD 83(1986) POSITION- 37 56 28. (N) 102 07 04. (W) SCALED
AE4822* NAVD 88 ORTHO HEIGHT - 1081.965 (meters) 3549.75 (feet) ADJUSTED
AE4822 *-----*
AE4822 GEOID HEIGHT - -24.025 (meters) GEOID12B
AE4822 DYNAMIC HEIGHT - 1080.938 (meters) 3546.38 (feet) COMP
AE4822 MODELED GRAVITY - 979,643.2 (mgal) NAVD 88
AE4822
AE4822 VERT ORDER - FIRST CLASS II
AE4822
AE4822.The horizontal coordinates were scaled from a topographic map and have
AE4822.an estimated accuracy of +/- 6 seconds.
AE4822.
AE4822.The orthometric height was determined by differential leveling and
AE4822.adjusted by the NATIONAL GEODETIC SURVEY
AE4822.in July 2002.
AE4822
AE4822.Significant digits in the geoid height do not necessarily reflect accuracy.
AE4822.GEOID12B height accuracy estimate available here.
AE4822
AE4822.The dynamic height is computed by dividing the NAVD 88
AE4822.geopotential number by the normal gravity value computed on the
AE4822.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AE4822.degrees latitude (g = 980.6199 gals.).
AE4822
AE4822.The modeled gravity was interpolated from observed gravity values.
AE4822
AE4822; North East Units Estimated Accuracy
AE4822;SPC CO S - 451,630. 1,211,630. MT (+/- 180 meters Scaled)
AE4822
AE4822_U.S. NATIONAL GRID SPATIAL ADDRESS: 13SGC532032(NAD 83)
AE4822
AE4822 SUPERSEDED SURVEY CONTROL
AE4822
AE4822.No superseded survey control is available for this station.
AE4822
AE4822_MARKER: I = METAL ROD
AE4822_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
AE4822_STAMPING: Z 441 1997
AE4822_MARK LOGO: NGS
AE4822_PROJECTION: FLUSH

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AE4822_MAGNETIC: I = MARKER IS A STEEL ROD
AE4822_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AE4822_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AE4822+SATELLITE: SATELLITE OBSERVATIONS - 1997
AE4822_ROD/PIPE-DEPTH: 20.5 meters
AE4822_SLEEVE-DEPTH : 0.9 meters

AE4822

AE4822	HISTORY	- Date	Condition	Report By
AE4822	HISTORY	- 1997	MONUMENTED	NGS

AE4822

AE4822 STATION DESCRIPTION

AE4822

AE4822'DESCRIBED BY NATIONAL GEODETIC SURVEY 1997 (GAS)
AE4822'12.5 KM (7.75 MI) SOUTHERLY ALONG STATE HIGHWAY 89 FROM THE JUNCTION
AE4822'OF U.S. HIGHWAY 50 IN HOLLY, 37.2 M (122.0 FT) WEST OF THE NORTH END
AE4822'OF A CULVERT UNDER COUNTY ROAD X, 23.4 M (76.8 FT) EAST OF THE HIGHWAY
AE4822'CENTERLINE, 12.0 M (39.4 FT) NORTH OF THE ROAD CENTER, 0.6 M (2.0 FT)
AE4822'SOUTH OF A WITNESS POST AND FENCE, AND 0.5 M (1.6 FT) ABOVE THE LEVEL
AE4822'OF THE HIGHWAY. NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH
AE4822'LOGO CAP. THE SLEEVE DEPTH DOES NOT MEET THE SPECIFICATIONS FOR A
AE4822'CLASS A MARK.

*** retrieval complete.
Elapsed Time = 00:00:03