Ground Control Survey Report
U.S. Geological Survey

Project No 82985

Task Order #: 140G0222F0109

USGS Contract: 140G0221D0013

USGS TN Davidson County Lidar 2022 D22

Client: USGS/Davidson County, TN

11/03/2022

WOOLPERT

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1.Survey Report

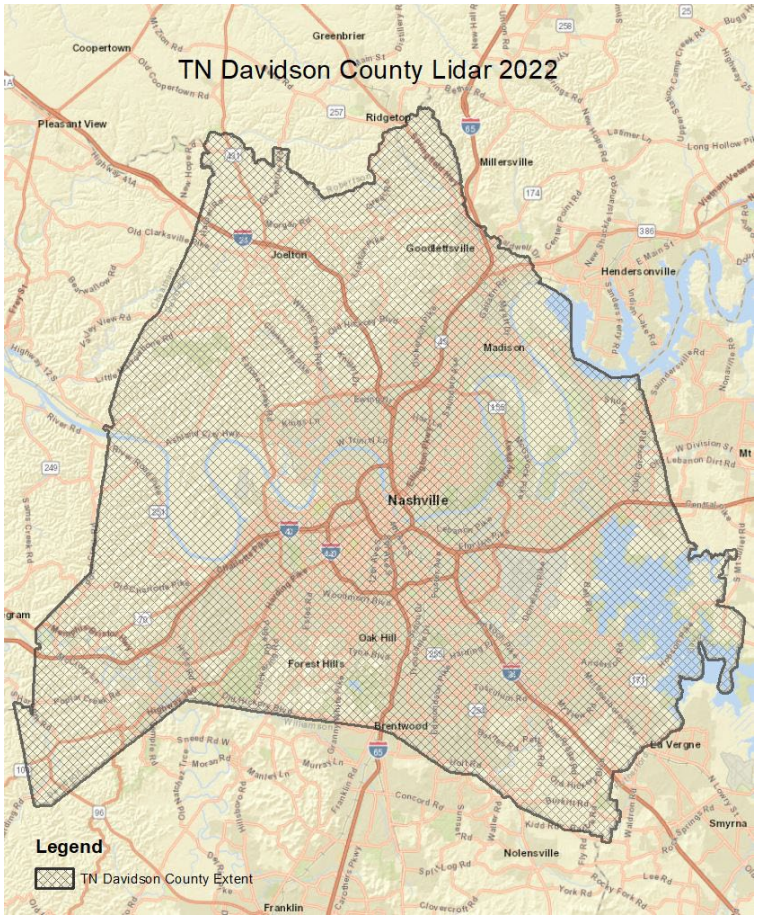
1.1. Introduction

This report contains a comprehensive outline of the Ground Control Survey that supported the lidar data collected for the task order. All survey activity was performed to achieve ground control accuracies that meet or exceed the National Mapping Accuracy Standards (NMAS).

1.2. Project Area

The project area consists of approximately 533 square miles for Davidson County, TN.

Defined Project Area



1.3. Purpose

The purpose of this survey was to establish three-dimensional coordinates for 25 calibration points, 37 non-vegetated checkpoints, and 27 vegetated check points. The points were collected per the flight layout and were uniformly dispersed over the project area.

1.4. Date of Survey

Ground control field operations were conducted March 2022.

1.5. Monumentation

Prior to lidar and aerial imagery acquisition, Woolpert field crews performed a field reconnaissance to verify the existence and suitability of pre-selected existing National Geodetic Survey (NGS) control stations. Existing NGS control stations were utilized as checks to ensure that quality x, y, z coordinate values were computed for each of the newly established control stations. Recovery information sheets for the existing NGS control stations can be found in Section 5 of this report. A control diagram can be found in Section 3 of this report.

1.6. Accuracy Standards

The relative vertical accuracy of the LiDAR data will be 10-cm RMSEz with swath overlap (between adjacent swaths) and an absolute-vertical accuracy of 15-cm RMSE.

1.7. GPS Equipment

Woolpert survey crews used the following GPS equipment:

- One (1) R10 Model GNSS dual-frequency GPS receiver
- One (1) R12i Model GNSS dual-frequency GPS receiver
- One (1) TSC7 data collector

1.8. Methodology

1.8.1. Static GPS

The field crew utilized Static GPS surveying throughout the ground control data collection process. The survey was conducted using a 5-second epoch rate with each observation lasting at least 30 minutes. Each station was occupied twice to ensure the required horizontal and vertical accuracies were met.

1.8.2. Real-time Kinematic (RTK) GPS

The field crew utilized Real-Time Kinematic (RTK) GPS surveying throughout the ground control data collection process. Using stations 101, 102, and 103 as base stations, RTK observations were performed on all photogrammetric control points in order to collect data efficiently and accurately. The survey was conducted using a 5-second epoch rate, in a fixed solution RTK mode, with each observation lasting 180 seconds. Each station was occupied twice to ensure the necessary horizontal and vertical accuracies were being met for this project.

RTK surveys were performed where cellular phone coverage was available and where baseline distance accuracy was maintained.

1.8.3. GPS Data Analysis and Processing

All static GPS observations were processed using Trimble Navigation's Trimble Business Center (TBC) 5.70 baseline processor with precise ephemeris. Both unconstrained and constrained adjustments were computed using trivial and nontrivial baselines. After an acceptable unconstrained least-squares adjustment was obtained, Woolpert performed a fully constrained least-squares adjustment by fixing the GPS network to existing NGS control stations with known coordinate data. Fixed solutions were obtained for all vector baselines.

1.8.4. Datum Reference and Final Coordinates

The spatial reference system for the project is NAD83 2011 (2010.00 epoch). Orthometric heights are based on NAVD88 vertical datum, Geoid18 was used to determine the orthometric heights from the ellipsoid heights. The projected coordinates are displayed in State Plane Coordinate System (Tennessee 4100). Units for both the horizontal and vertical datums will be expressed in US Survey Feet to two (2) decimal places.

1.8.5. Quality Assurance

The primary control network was processed utilizing three (3) TSM (Temporary Survey Marks) derived through OPUS (Online Positioning User Service). NGS published survey marks were also recovered and surveyed as checkpoints to assure that there were no discrepancies in the field observation data. Close examinations of the residuals showed no distortions in orientation or scale. Ground control data meets positional accuracies at 95% confidence level as outlined in the *"Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy (NSSDA)", (FGDC-STD-007.3-1998)*.

2. Ground Control/Geodetic Control Coordinates

2.1. Geodetic Control

- Horizontal Datum: NAD 1983 (2011) epoch: 2010
- Horizontal Projection: Tennessee (4100)
- Vertical Datum: NAVD88
- Geoid Model: Geoid18 (Conus)
- Units: US Survey Feet

Table 2.1 Geodetic Control

Point Number	Northing (sft)	Easting (sft)	Orthometric Height (sft)	Description
GPS 12	771920.87	1645362.32	696.57	GC2720
GPS 27	595199.86	1730262.65	735.66	FD1646
GPS 28	616086.41	1596921.85	699.66	GC2724
REGION	669278.18	1710847.38	411.68	DG7697
SULPHER RM 2	772827.74	1763421.08	868.99	GC0538
U 302	623075.16	1736835.75	722.06	GC1963
Y 302	657703.15	1738441.98	568.47	GC1967

2.2. Ground Control

- Horizontal Datum: NAD 1983 (2011) epoch: 2010
- Horizontal Projection: Tennessee (4100)
- Vertical Datum: NAVD88
- Geoid Model: Geoid18 (Conus)
- Units: US Survey Feet

Table 2.2 Ground Control -

Point Number	Northing (sft)	Easting (sft)	Orthometric Height (sft)	Description
1001_2022_TN	617420.74	1794609.58	548.81	LCP
1002_2022_TN	626377.29	1787417.12	599.10	LCP
1003_2022_TN	630949.67	1782247.42	597.93	LCP
1004_2022_TN	602351.25	1769284.87	620.81	LCP
1005_2022_TN	641534.95	1775689.05	664.79	LCP
1006_2022_TN	681230.73	1785714.29	487.29	LCP
1007_2022_TN	648693.84	1764271.26	589.34	LCP
1008_2022_TN	655109.23	1756501.18	500.30	LCP
1009_2022_TN	721164.14	1775863.54	491.75	LCP
1010_2022_TN	659801.97	1748153.86	478.85	LCP
1011_2022_TN	659463.25	1738212.56	568.71	LCP
1012_2022_TN	619832.50	1731277.37	703.22	LCP
1013_2022_TN	739742.67	1756024.88	597.82	LCP
1014_2022_TN	645201.62	1693958.95	536.77	LCP
1015_2022_TN	651495.83	1706026.50	471.32	LCP
1016_2022_TN	738073.38	1719441.29	815.67	LCP
1017_2022_TN	657498.42	1731066.11	572.84	LCP
1018_2022_TN	641599.05	1678835.96	556.41	LCP
1019_2022_TN	637728.10	1819447.09	605.10	LCP
1020_2022_TN	729408.52	1695176.67	812.06	LCP
1021_2022_TN	639765.66	1668543.73	540.91	LCP
1022_2022_TN	644140.17	1663438.85	581.28	LCP
1023_2022_TN	652333.80	1719427.07	488.93	LCP
1024_2022_TN	606011.84	1660399.81	584.60	LCP
1025_2022_TN	753198.39	1743871.32	877.75	LCP
2001_2022_TN	612058.35	1764299.39	545.24	NVA
2002_2022_TN	637571.73	1687870.14	596.46	NVA
2003_2022_TN	696980.83	1723515.30	462.96	NVA
2004_2022_TN	694329.89	1754478.22	504.37	NVA
2005_2022_TN	647223.11	1726034.09	538.15	NVA
2006_2022_TN	664633.96	1722360.97	514.64	NVA
2007_2022_TN	674530.84	1768905.83	509.95	NVA
2008_2022_TN	631360.86	1744597.32	594.95	NVA

Point Number	Northing (sft)	Easting (sft)	Orthometric Height (sft)	Description
2009_2022_TN	691762.63	1699922.57	487.35	NVA
2010_2022_TN	621421.17	1777593.46	595.74	NVA
2011_2022_TN	655105.45	1716017.81	490.10	NVA
2012_2022_TN	670059.35	1709391.63	417.43	NVA
2013_2022_TN	725214.79	1713243.23	826.93	NVA
2014_2022_TN	701445.87	1775638.43	488.93	NVA
2015_2022_TN	657569.18	1741108.55	521.49	NVA
2016_2022_TN	672891.50	1740695.13	429.26	NVA
2017_2022_TN	623105.03	1758083.40	623.16	NVA
2018_2022_TN	623996.21	1685517.70	580.40	NVA
2019_2022_TN	644982.64	1770906.99	588.27	NVA
2020_2022_TN	639254.97	1788888.62	542.54	NVA
2021_2022_TN	680865.80	1794567.08	457.43	NVA
2022_2022_TN	638182.62	1704723.56	665.45	NVA
2023_2022_TN	638035.29	1712324.74	578.15	NVA
2024_2022_TN	735890.86	1709472.76	800.37	NVA
2025_2022_TN	677227.08	1748475.61	516.62	NVA
2026_2022_TN	705110.69	1745496.70	591.85	NVA
2027_2022_TN	660404.62	1724195.00	568.01	NVA
2028_2022_TN	721729.22	1757935.41	547.21	NVA
2029_2022_TN	630673.76	1729066.79	740.83	NVA
2030_2022_TN	623136.31	1795640.05	534.87	NVA
2031_2022_TN	678289.03	1730519.07	405.75	NVA
2032_2022_TN	645771.43	1754523.47	507.52	NVA
2033_2022_TN	743857.42	1748686.56	547.18	NVA
2034_2022_TN	667119.87	1688369.47	410.20	NVA
2035_2022_TN	641601.21	1807561.24	511.13	NVA
2036_2022_TN	734515.05	1735341.87	934.39	NVA
2037_2022_TN	618005.39	1666653.56	572.50	NVA
3001_2022_TN	623410.77	1797656.94	507.03	VVA
3002_2022_TN	672852.87	1758630.07	414.29	VVA
3003_2022_TN	615728.19	1757479.53	676.60	VVA
3004_2022_TN	669998.39	1693071.09	397.44	VVA
3005_2022_TN	709600.09	1738779.56	550.07	VVA
3006_2022_TN	731861.77	1700020.73	753.64	VVA
3007_2022_TN	617479.43	1789705.91	622.28	VVA
3008_2022_TN	705945.20	1691277.26	531.92	VVA
3009_2022_TN	607623.60	1778818.02	646.39	VVA
3010_2022_TN	658594.39	1686009.76	457.83	VVA
3011_2022_TN	643366.52	1671696.00	686.49	VVA
3012_2022_TN	727640.64	1753384.07	497.62	VVA
3013_2022_TN	618198.86	1669300.27	599.95	VVA

Point Number	Northing (sft)	Easting (sft)	Orthometric Height (sft)	Description
3014_2022_TN	639275.95	1795660.12	519.50	VVA
3015_2022_TN	686200.49	1758951.06	466.65	VVA
3016_2022_TN	709777.88	1761883.89	471.43	VVA
3018_2022_TN	659676.13	1795724.39	524.76	VVA
3019_2022_TN	706528.18	1714884.31	548.26	VVA
3020_2022_TN	695498.87	1706177.08	622.81	VVA
3021_2022_TN	722675.23	1723217.18	601.63	VVA
3022_2022_TN	625403.65	1724125.13	1096.17	VVA
3023_2022_TN	674792.94	1771998.18	417.27	VVA
3024_2022_TN	677384.63	1720877.51	489.54	VVA
3025_2022_TN	634982.97	1737410.46	673.85	VVA
3026_2022_TN	742079.56	1749682.61	525.66	VVA
3027_2022_TN	658149.02	1743834.38	445.70	VVA
3128_2021_OH	303299.17	2390617.50	1226.99	VVA
3132_2020_OH	306031.18	2105965.47	813.39	VVA
3134_2020_OH	410539.71	2349321.43	1109.90	VVA
3135_2020_OH	231880.79	2417954.26	1245.08	VVA
3136_2021_OH	189982.52	2331214.54	1158.80	VVA
3137_2021_OH	219706.10	2308668.17	895.57	VVA
3140_2021_OH	310068.88	1968018.07	1108.28	VVA
3143_2020_OH	306505.94	2092336.80	833.19	VVA
3146_2021_OH	205390.11	2243504.51	1136.57	VVA
3148_2020_OH	308292.02	2317793.57	917.08	VVA
3149_2020_OH	449987.14	2216652.92	948.09	VVA
3155_2020_OH	423113.24	2189721.44	1106.54	VVA
3156_2020_OH	420287.24	2411655.59	1219.76	VVA
3157_2020_OH	390272.16	2182793.40	1061.23	VVA
3160_2020_OH	320470.44	2277144.33	1020.27	VVA
3161_2020_OH	317262.16	2140744.22	882.62	VVA
3162_2020_OH	311606.93	2098535.72	1111.94	VVA

2.3. Geodetic Control- Geodetic Coordinate System NAD83

- Horizontal Datum: NAD 1983 (2011) epoch: 2010
- Horizontal Projection: Tennessee (4100)
- Vertical Datum: NAVD88
- Geoid Model: Geoid18 (Conus)
- Units: US Survey Feet

Table 2.3 Ground Control - Geodetic Coordinate System NAD83

Point Number	NAD83 (Conus) Latitude (N)	NAD83 (Conus) Longitude (W)	Ellipsoid Height (sft)	Description
GPS 12	N36° 26' 56.15661"	W87° 05' 55.14775"	599.83	GC2720
GPS 27	N35° 57' 56.80765"	W86° 48' 18.24555"	640.92	FD1646
GPS 28	N36° 01' 09.46674"	W87° 15' 23.50167"	605.48	GC2724
REGION	N36° 10' 07.72428"	W86° 52' 22.46519"	315.29	DG7697
SULPHER RM 2	N36° 27' 15.83479"	W86° 41' 50.27158"	771.60	GC0538
U 302	N36° 02' 33.00000"	W86° 47' 01.00000"	626.72	GC1963
Y 302	N36° 08' 15.56387"	W86° 46' 44.79827"	472.36	GC1967

2.4. Ground Control-Geodetic Coordinate System NAD83

- Horizontal Datum: NAD 1983 (2011) epoch: 2010
- Horizontal Projection: Tennessee (4100)
- Vertical Datum: NAVD88
- Geoid Model: Geoid18 (Conus)
- Units: US Survey Feet

Table 2.4 Ground Control – Geodetic Coordinate System NAD83

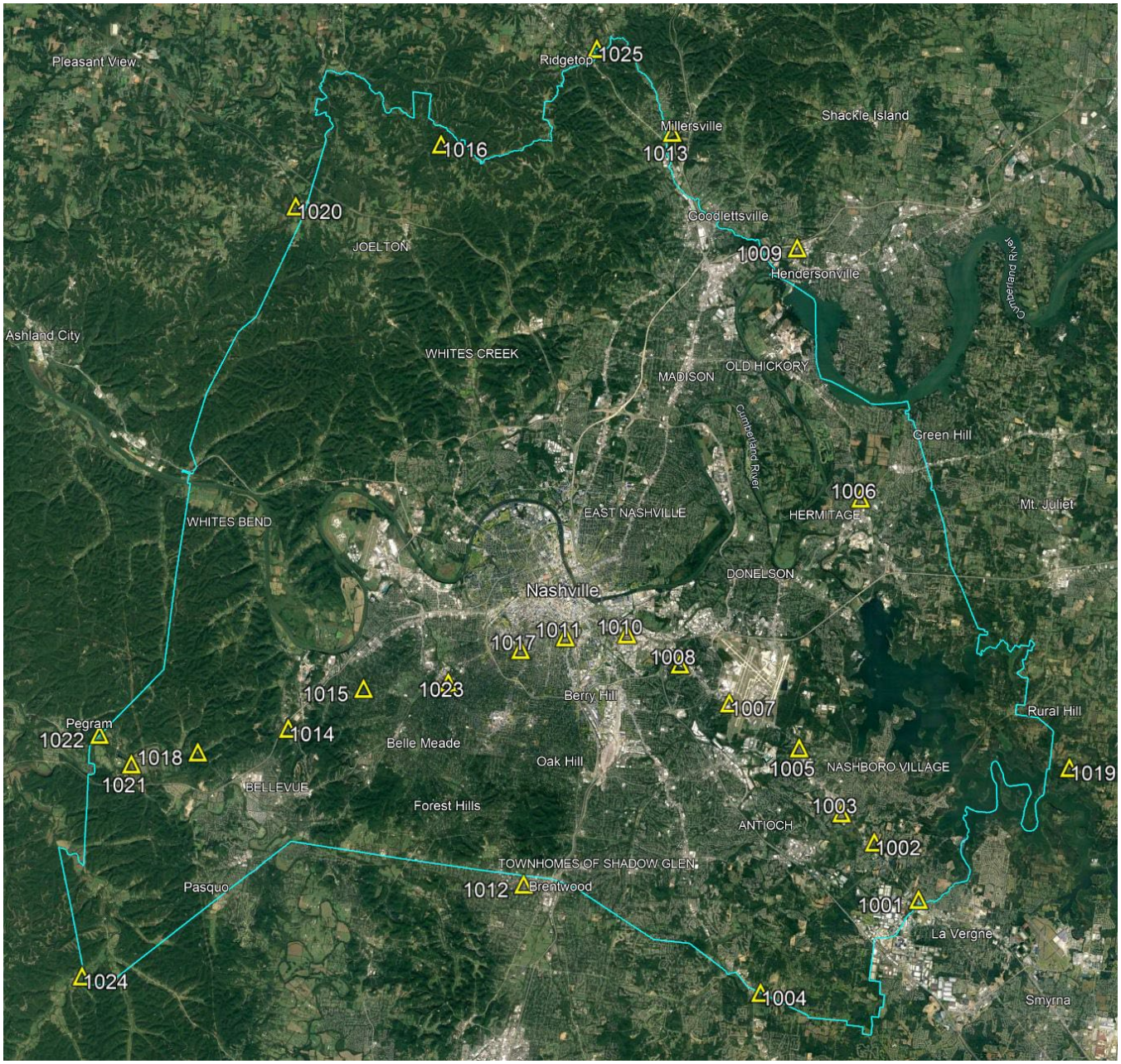
Point Number	NAD83 (Conus) Latitude (N)	NAD83 (Conus) Longitude (W)	Ellipsoid Height (sft)	Description
1001_2022_TN	N36°01'41.08605"	W86°35'17.08790"	453.55	LCP
1002_2022_TN	N36°03'09.22358"	W86°36'45.33529"	503.64	LCP
1003_2022_TN	N36°03'54.11616"	W86°37'48.65185"	502.37	LCP
1004_2022_TN	N35°59'10.44493"	W86°40'24.14074"	525.72	LCP
1005_2022_TN	N36°05'38.37055"	W86°39'09.39359"	569.04	LCP
1006_2022_TN	N36°12'11.56585"	W86°37'10.30166"	390.89	LCP
1007_2022_TN	N36°06'48.39008"	W86°41'29.13069"	493.43	LCP
1008_2022_TN	N36°07'51.27859"	W86°43'04.40221"	404.23	LCP
1009_2022_TN	N36°18'45.82083"	W86°39'13.74949"	394.75	LCP
1010_2022_TN	N36°08'37.06737"	W86°44'46.59376"	382.67	LCP
1011_2022_TN	N36°08'32.95128"	W86°46'47.76625"	472.52	LCP
1012_2022_TN	N36°02'00.48756"	W86°48'08.35817"	607.97	LCP
1013_2022_TN	N36°21'48.15429"	W86°43'17.81566"	500.72	LCP
1014_2022_TN	N36°06'08.09797"	W86°55'45.64486"	441.04	LCP
1015_2022_TN	N36°07'11.44899"	W86°53'19.29055"	375.35	LCP
1016_2022_TN	N36°21'28.75110"	W86°50'44.90596"	718.78	LCP
1017_2022_TN	N36°08'12.94934"	W86°48'14.69822"	476.69	LCP
1018_2022_TN	N36°05'31.01349"	W86°58'49.48665"	460.91	LCP
1019_2022_TN	N36°05'03.28199"	W86°30'15.97540"	509.73	LCP
1020_2022_TN	N36°20'00.89678"	W86°55'40.53539"	715.37	LCP
1021_2022_TN	N36°05'11.84574"	W87°00'54.65439"	445.55	LCP
1022_2022_TN	N36°05'54.57622"	W87°01'57.40983"	485.91	LCP
1023_2022_TN	N36°07'20.90827"	W86°50'36.04727"	392.90	LCP
1024_2022_TN	N35°59'37.21100"	W87°02'29.49570"	490.03	LCP
1025_2022_TN	N36°24'00.29581"	W86°45'47.68760"	780.62	LCP
2001_2022_TN	N36°00'46.09788"	W86°41'25.63770"	449.96	NVA
2002_2022_TN	N36°04'52.06882"	W86°56'58.93807"	500.95	NVA
2003_2022_TN	N36°14'42.75679"	W86°49'50.83634"	366.27	NVA
2004_2022_TN	N36°14'18.97739"	W86°43'32.60796"	407.67	NVA
2005_2022_TN	N36°06'30.92453"	W86°49'14.99309"	442.24	NVA
2006_2022_TN	N36°09'22.79136"	W86°50'01.56381"	418.33	NVA
2007_2022_TN	N36°11'04.21113"	W86°40'34.82273"	413.59	NVA
2008_2022_TN	N36°03'55.54270"	W86°45'27.27135"	499.36	NVA
2009_2022_TN	N36°13'49.08065"	W86°54'38.25384"	390.82	NVA

Point Number	NAD83 (Conus) Latitude (N)	NAD83 (Conus) Longitude (W)	Ellipsoid Height (sft)	Description
2010_2022_TN	N36°02'19.58676"	W86°38'44.57208"	500.30	NVA
2011_2022_TN	N36°07'48.02419"	W86°51'17.89708"	394.01	NVA
2012_2022_TN	N36°10'15.32026"	W86°52'40.30470"	321.03	NVA
2013_2022_TN	N36°19'21.06578"	W86°51'59.28564"	730.19	NVA
2014_2022_TN	N36°15'30.82019"	W86°39'14.88963"	392.14	NVA
2015_2022_TN	N36°08'14.44779"	W86°46'12.27677"	425.34	NVA
2016_2022_TN	N36°10'45.93584"	W86°46'18.79018"	332.82	NVA
2017_2022_TN	N36°02'34.90067"	W86°42'42.27736"	527.69	NVA
2018_2022_TN	N36°02'37.59481"	W86°57'25.97864"	485.20	NVA
2019_2022_TN	N36°06'12.14584"	W86°40'07.94808"	492.44	NVA
2020_2022_TN	N36°05'16.66421"	W86°36'28.38905"	446.90	NVA
2021_2022_TN	N36°12'08.49785"	W86°35'22.25809"	361.10	NVA
2022_2022_TN	N36°04'59.67867"	W86°53'33.69110"	569.86	NVA
2023_2022_TN	N36°04'58.89757"	W86°52'01.07190"	482.51	NVA
2024_2022_TN	N36°21'06.30097"	W86°52'46.53145"	703.54	NVA
2025_2022_TN	N36°11'29.40611"	W86°44'44.28964"	420.16	NVA
2026_2022_TN	N36°16'04.91214"	W86°45'23.26011"	495.06	NVA
2027_2022_TN	N36°08'41.12197"	W86°49'38.76357"	471.79	NVA
2028_2022_TN	N36°18'50.16912"	W86°42'52.84924"	450.22	NVA
2029_2022_TN	N36°03'47.51780"	W86°48'36.36499"	645.36	NVA
2030_2022_TN	N36°02'37.67004"	W86°35'04.95815"	439.53	NVA
2031_2022_TN	N36°11'38.49929"	W86°48'23.45597"	309.22	NVA
2032_2022_TN	N36°06'18.79300"	W86°43'27.66836"	411.62	NVA
2033_2022_TN	N36°22'28.29773"	W86°44'47.91756"	450.08	NVA
2034_2022_TN	N36°09'44.31229"	W86°56'56.34562"	314.04	NVA
2035_2022_TN	N36°05'40.95395"	W86°32'41.04552"	415.60	NVA
2036_2022_TN	N36°20'54.88080"	W86°47'30.16779"	837.48	NVA
2037_2022_TN	N36°01'36.46656"	W87°01'14.91721"	477.61	NVA
3001_2022_TN	N36°02'40.50276"	W86°34'40.41838"	411.69	VVA
3002_2022_TN	N36°10'46.89767"	W86°42'40.02228"	317.92	VVA
3003_2022_TN	N36°01'21.90608"	W86°42'48.97551"	581.29	VVA
3004_2022_TN	N36°10'13.22419"	W86°55'59.34507"	301.17	VVA
3005_2022_TN	N36°16'48.78457"	W86°46'45.72128"	453.27	VVA
3006_2022_TN	N36°20'25.60522"	W86°54'41.61450"	656.90	VVA
3007_2022_TN	N36°01'41.37096"	W86°36'16.79230"	526.97	VVA
3008_2022_TN	N36°16'08.51610"	W86°56'25.43535"	435.38	VVA
3009_2022_TN	N36°00'03.21822"	W86°38'28.56080"	551.21	VVA
3010_2022_TN	N36°08'19.77901"	W86°57'24.10548"	361.89	VVA
3011_2022_TN	N36°05'47.77563"	W87°00'16.70032"	591.04	VVA
3012_2022_TN	N36°19'48.29161"	W86°43'48.99810"	400.62	VVA
3013_2022_TN	N36°01'38.65159"	W87°00'42.72063"	505.04	VVA
3014_2022_TN	N36°05'17.27979"	W86°35'05.88845"	423.91	VVA
3015_2022_TN	N36°12'58.91267"	W86°42'37.28873"	370.07	VVA

Point Number	NAD83 (Conus) Latitude (N)	NAD83 (Conus) Longitude (W)	Ellipsoid Height (sft)	Description
3016_2022_TN	N36°16'52.27052"	W86°42'03.55915"	374.53	VVA
3018_2022_TN	N36°08'39.02291"	W86°35'06.59155"	428.85	VVA
3019_2022_TN	N36°16'16.42851"	W86°51'37.22493"	451.59	VVA
3020_2022_TN	N36°14'26.59538"	W86°53'22.33006"	526.22	VVA
3021_2022_TN	N36°18'56.80989"	W86°49'57.14405"	504.85	VVA
3022_2022_TN	N36°02'54.99263"	W86°49'36.01087"	1000.83	VVA
3023_2022_TN	N36°11'07.01268"	W86°39'57.12250"	320.92	VVA
3024_2022_TN	N36°11'28.75433"	W86°50'20.98630"	393.02	VVA
3025_2022_TN	N36°04'30.80296"	W86°46'55.16057"	578.23	VVA
3026_2022_TN	N36°22'10.79281"	W86°44'35.57309"	428.57	VVA
3027_2022_TN	N36°08'20.39259"	W86°45'39.10073"	349.54	VVA

3. GPS Control Diagram

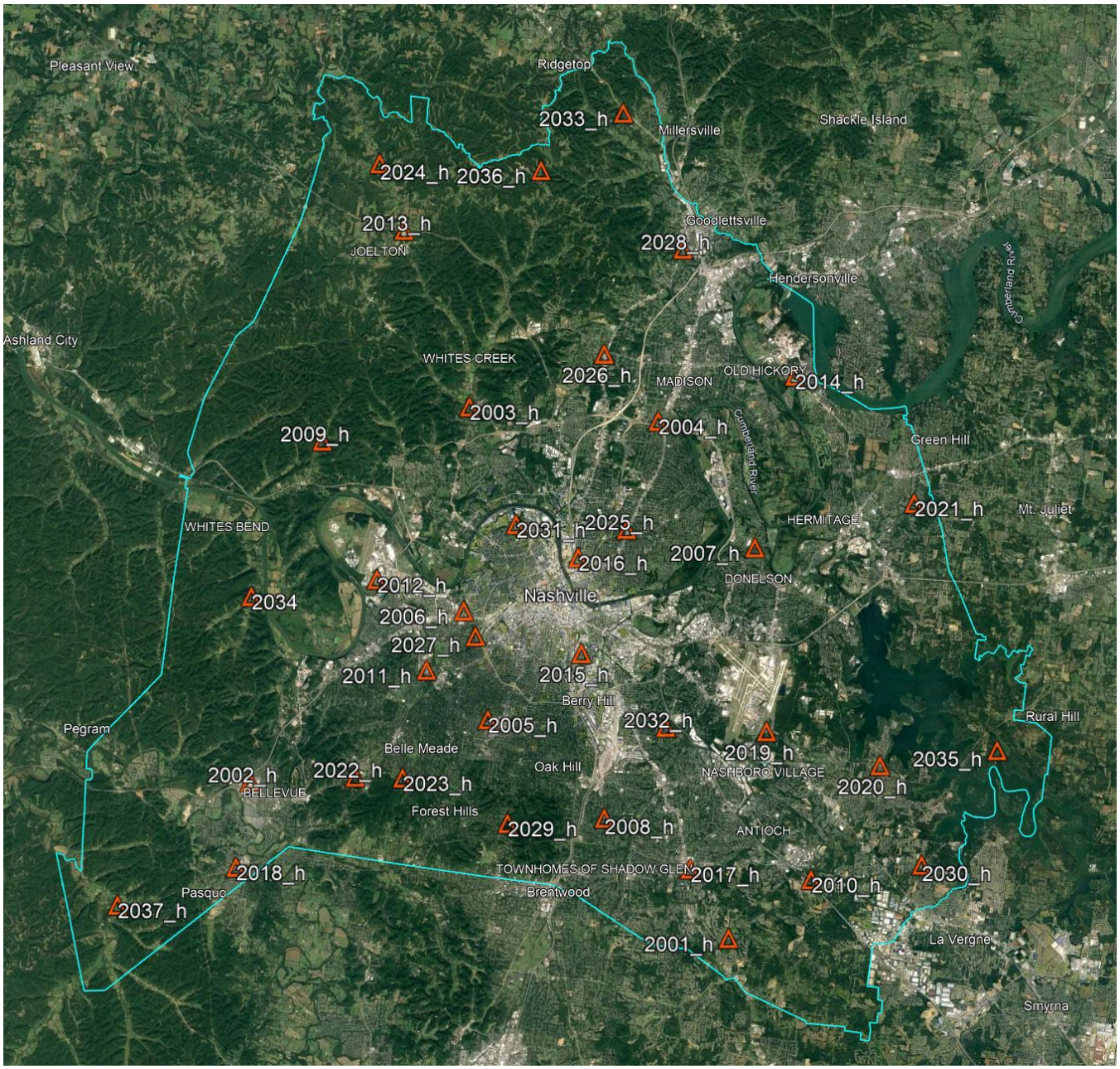
Image 3.1 Overview of the Lidar Control Network



N

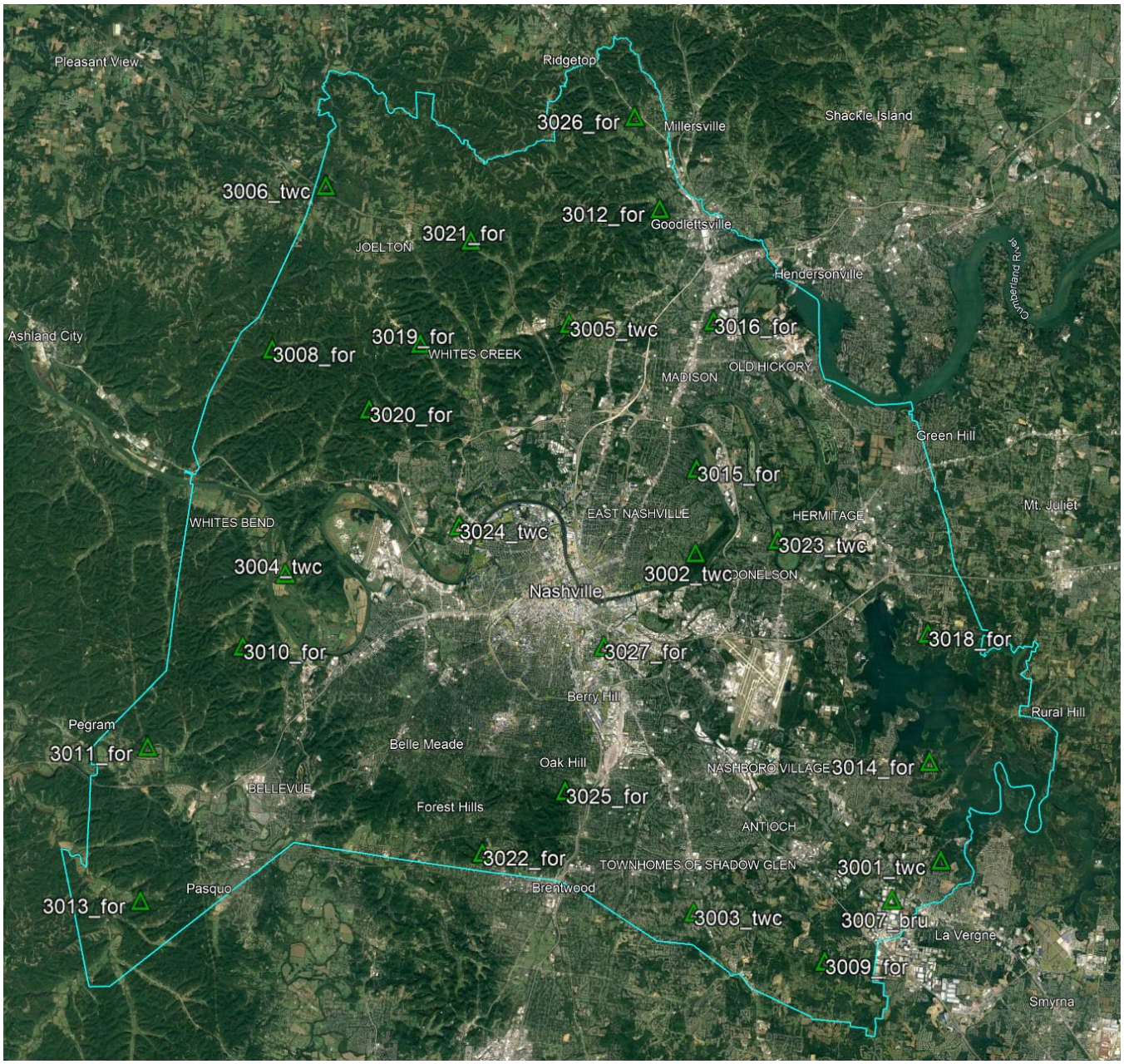
Not to Scale

Image 3.2 Overview of the Lidar NVA Network



N
Not to Scale

Image 3.3 Overview of the Lidar VVA Network



N

Not to Scale

4. NGS Datasheets

Below are the published National Geodetic Survey (NGS) datasheets for those existing monumented control stations used to establish 3-dimensional coordinates for each of the newly established project ground control survey points.

4.1. NGS Data Sheet

```
National Geodetic Survey,   Retrieval Date = APRIL  8, 2022
GC2720 ***********************************************************************
GC2720  CBN         -  This is a Cooperative Base Network Control Station.
GC2720  DESIGNATION -  GPS 12
GC2720  PID         -  GC2720
GC2720  STATE/COUNTY-  TN/ROBERTSON
GC2720  COUNTRY     -  US
GC2720  USGS QUAD   -  PLEASANT VIEW (2019)
GC2720
GC2720                        *CURRENT SURVEY CONTROL
GC2720  ______________________________________________________________________
GC2720* NAD 83(2011) POSITION- 36 26 56.15661(N) 087 05 55.14775(W)   ADJUSTED
GC2720* NAD 83(2011) ELLIP HT-   182.829 (meters)        (06/27/12)   ADJUSTED
GC2720* NAD 83(2011) EPOCH   -  2010.00
GC2720* NAVD 88 ORTHO HEIGHT -   212.316 (meters)      696.57  (feet) ADJUSTED
GC2720  ______________________________________________________________________
GC2720  GEOID HEIGHT    -        -29.487 (meters)                     GEOID18
GC2720  NAD 83(2011) X  -    260,001.831 (meters)                     COMP
GC2720  NAD 83(2011) Y  - -5,130,123.352 (meters)                     COMP
GC2720  NAD 83(2011) Z  -  3,768,486.321 (meters)                     COMP
GC2720  LAPLACE CORR    -         -0.92  (seconds)                    DEFLEC18
GC2720  DYNAMIC HEIGHT  -        212.140 (meters)      696.00  (feet) COMP
GC2720  MODELED GRAVITY -    979,798.7   (mgal)                       NAVD 88
GC2720
GC2720  VERT ORDER      -  SECOND    CLASS II
GC2720
GC2720  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
GC2720  Standards:
GC2720         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
GC2720            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
GC2720  ------------------------------------------------------------------
GC2720  NETWORK    0.56   1.39           0.24   0.22   0.71      0.03894067
GC2720  ------------------------------------------------------------------
GC2720  Click here for local accuracies and other accuracy information.
GC2720
GC2720
GC2720.The horizontal coordinates were established by GPS observations
GC2720.and adjusted by the National Geodetic Survey in June 2012.
GC2720
GC2720.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
GC2720.been affixed to the stable North American tectonic plate. See
GC2720.NA2011 for more information.
GC2720
GC2720.The horizontal coordinates are valid at the epoch date displayed above
GC2720.which is a decimal equivalence of Year/Month/Day.
GC2720
GC2720.The orthometric height was determined by differential leveling and
GC2720.adjusted by the NATIONAL GEODETIC SURVEY
GC2720.in May 2012.
GC2720
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GC2720.Significant digits in the geoid height do not necessarily reflect accuracy.
GC2720.GEOID18 height accuracy estimate available here.
GC2720
GC2720.Click photographs - Photos may exist for this station.
GC2720
GC2720.The X, Y, and Z were computed from the position and the ellipsoidal ht.
GC2720
GC2720.The Laplace correction was computed from DEFLEC18 derived deflections.
GC2720
GC2720.The ellipsoidal height was determined by GPS observations
GC2720.and is referenced to NAD 83.
GC2720
GC2720.The dynamic height is computed by dividing the NAVD 88
GC2720.geopotential number by the normal gravity value computed on the
GC2720.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
GC2720.degrees latitude (g = 980.6199 gals.).
GC2720
GC2720.The modeled gravity was interpolated from observed gravity values.
GC2720
GC2720. The following values were computed from the NAD 83(2011) position.
GC2720
GC2720;                    North         East     Units Scale Factor Converg.
GC2720;SPC TN       -   235,281.952   501,507.438   MT  1.00000588   -0 38 35.5
GC2720;SPC TN       -   771,920.87  1,645,362.32   sFT  1.00000588   -0 38 35.5
GC2720;UTM  16      - 4,033,748.010   491,159.381   MT  0.99960096   -0 03 31.0
GC2720
GC2720!             -  Elev Factor  x  Scale Factor =   Combined Factor
GC2720!SPC TN       -   0.99997131  x   1.00000588  =   0.99997719
GC2720!UTM  16      -   0.99997131  x   0.99960096  =   0.99957228
GC2720
GC2720_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SDF9115933748(NAD 83)
GC2720
GC2720                           SUPERSEDED SURVEY CONTROL
GC2720
GC2720  NAD 83(2007)-  36 26 56.15659(N)    087 05 55.14825(W) AD(2002.00) A
GC2720  ELLIP H (10/19/11)  182.833  (m)                       GP(2002.00) 3 1
GC2720  NAD 83(2007)-  36 26 56.15616(N)    087 05 55.14786(W) AD(2002.00) A
GC2720  ELLIP H (10/16/11)  183.120  (m)                       GP(2002.00) 3 2
GC2720  NAD 83(2007)-  36 26 56.15652(N)    087 05 55.14829(W) AD(2002.00) 0
GC2720  ELLIP H (02/10/07)  183.118  (m)                       GP(2002.00)
GC2720  ELLIP H (08/03/04)  183.101  (m)                       GP(       ) 4 1
GC2720  NAD 83(1995)-  36 26 56.15662(N)    087 05 55.14863(W) AD(       ) B
GC2720  ELLIP H (12/14/95)  182.866  (m)                       GP(       ) 1 2
GC2720  NAD 83(1990)-  36 26 56.15835(N)    087 05 55.15291(W) AD(       ) B
GC2720  ELLIP H (09/07/90)  182.833  (m)                       GP(       ) 4 1
GC2720  NAVD 88 (02/01/05)  212.5    (m)  UNKNOWN model used   GPS OBS
GC2720  NAVD 88             212.51   (m)          697.2    (f) LEVELING    3
GC2720  NAVD 88 (08/13/96)  212.510  (m)          697.21   (f) SUPERSEDED  3 0
GC2720  NAVD 88             212.30   (m)          696.5    (f) LEVELING    3
GC2720  NGVD 29 (??/??/??)  212.57   (m)          697.4    (f) N HEIGHT    3
GC2720  NGVD 29             212.57   (m)          697.4    (f) LEVELING    3
GC2720
GC2720.Superseded values are not recommended for survey control.
GC2720
GC2720.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
GC2720.See file dsdata.pdf to determine how the superseded data were derived.
GC2720
GC2720_MARKER: F = FLANGE-ENCASED ROD
GC2720_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
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GC2720_STAMPING: GPS 12 1987
GC2720_MARK LOGO: NGS
GC2720_PROJECTION: FLUSH
GC2720_MAGNETIC: S = STEEL SPIKE IMBEDDED IN MONUMENT
GC2720_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
GC2720_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
GC2720+SATELLITE: SATELLITE OBSERVATIONS - November 17, 2008
GC2720_ROD/PIPE-DEPTH: 7.30 meters
GC2720_SLEEVE-DEPTH  : 0.90 meters
GC2720
GC2720  HISTORY     - Date     Condition        Report By
GC2720  HISTORY     - 1987     MONUMENTED       NGS
GC2720  HISTORY     - 1987     GOOD             NGS
GC2720  HISTORY     - 19890524 GOOD
GC2720  HISTORY     - 19901219 GOOD             NGS
GC2720  HISTORY     - 19910129 GOOD
GC2720  HISTORY     - 19930420 GOOD             NOS
GC2720  HISTORY     - 19950615 GOOD             NGS
GC2720  HISTORY     - 19970115 GOOD             TNDT
GC2720  HISTORY     - 20031010 GOOD             TNDT
GC2720  HISTORY     - 20081117 GOOD             TNDOT
GC2720
GC2720                          STATION DESCRIPTION
GC2720
GC2720'DESCRIBED BY NATIONAL GEODETIC SURVEY 1987 (DAC)
GC2720'THE STATION IS LOCATED ABOUT 43.5 KM (27 MI)
GC2720'NORTHWEST OF NASHVILLE,
GC2720'24.1 KM (15 MI) EAST-SOUTHEAST OF CLARKSVILLE, AT THE JUNCTION OF
GC2720'INTERSTATE 24 AND STATE ROUTE 256 (EXIT 19).
GC2720'OWNERSHIP--HIGHWAY RIGHT-OF-WAY.
GC2720'
GC2720'THE STATION IS LOCATED AT THE JUNCTION OF INTERSTATE 24 AND STATE
GC2720'ROUTE 256 (EXIT 19), IN THE SOUTHEAST QUADRANT OF THE INTERCHANGE.
GC2720'
GC2720'THE STATION IS A 3-D MARK WITH STAINLESS STEEL ROD DRIVEN 7.3 METERS
GC2720'(24 FT).  THE LOGO CAP IS STAMPED---GPS 12 1987---, AND A RAILROAD
GC2720'SPIKE IS SET IN THE CONCRETE.  LOCATED 124.3 METERS (408 FT)
GC2720'SOUTHEAST FROM SOUTHEAST CORNER OF THE OVERPASS BRIDGE, 20.9 METERS
GC2720'(68.5 FT) SOUTHWEST FROM THE SOUTHWEST EDGE OF THE EASTBOUND
GC2720'INTERSTATE 24 PAVEMENT, 86.6 METERS (284 FT) NORTHEAST FROM A
GC2720'CULVERT HEADWALL UNDER THE ENTRANCE RAMP, 30.6 METERS (100.5 FT)
GC2720'NORTHEAST FROM THE CENTER OF A CONCRETE DITCH, 0.3 METERS (1.0 FT)
GC2720'NORTHWEST FROM A FIBERGLASS WITNESS POST.
GC2720
GC2720                          STATION RECOVERY (1987)
GC2720
GC2720'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1987
GC2720'RECOVERED IN GOOD CONDITION.
GC2720
GC2720                          STATION RECOVERY (1989)
GC2720
GC2720'RECOVERED 1989
GC2720'RECOVERED IN GOOD CONDITION.
GC2720
GC2720                          STATION RECOVERY (1990)
GC2720
GC2720'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1990
GC2720'THE STATION IS LOCATED ABOUT 24.1 KM (15.0 MI) EAST-SOUTHEAST OF
GC2720'CLARKSVILLE, 43.5 KM (27.0 MI) NORTHWEST OF NASHVILLE AND ON THE
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GC2720'SOUTH SIDE OF THE EASTBOUND LANE OF INTERSTATE HIGHWAY 24.
GC2720'OWNERSHIP--TENESSEE DEPARTMENT OF TRANSPORTATION, P.O. BOX 23107,
GC2720'NASHVILLE, TN 37202, PHONE 615-741-2158.
GC2720'TO REACH THE STATION FROM THE JUNCTION OF THE NORTHEAST END OF THE
GC2720'STATE HIGHWAY 256 OVERPASS BRIDGE OVER INTERSTATE HIGHWAY 24 (EXIT
GC2720'19)AND THE STATE HIGHWAY 256 ENTRANCE RAMP LEADING TO INTERSTATE 24,
GC2720'ABOUT 24.1 KM (15.0 MI) EAST-SOUTHEAST OF CLARKSVILLE, GO NORTHWEST
GC2720'ALONG THE ENTRANCE RAMP TO ITS JUNCTION OF THE INTERSTATE, GO
GC2720'NORTHWEST ON INTERSTATE 24 FOR 4.26 KM (2.65 MI) TO AN OFFICAL USE
GC2720'TURN-AROUND, TURN LEFT TO THE EASTBOUND LANE OF INTERSTATE 24, TURN
GC2720'LEFT, SOUTHEAST, ON THE EASTBOUND LANE OF INTERSTATE 24 FOR 4.26 KM
GC2720'(2.65 MI) TO THE STATE HIGHWAY 256 OVERPASS BRIDGE (EXIT 19),
GC2720'CONTINUE AHEAD ON THE INTERSTATE FOR 0.16 KM (0.10 MI) TO THE STATION
GC2720'ON RIGHT.
GC2720'THE STATION IS LOCATED ON THE SOUTHWEST SIDE OF THE EASTBOUND LANE OF
GC2720'INTERSTATE 24, 0.16 KM (0.10 MI) SOUTHEAST OF THE STATE HIGHWAY 256
GC2720'OVERPASS BRIDGE (EXIT 19), 86.6 M (284.1 FT) NORTHEAST OF THE
GC2720'HEADWALL OF A CULVERT UNDER THE ENTRANCE RAMP, 30.6 M (100.4 FT)
GC2720'NORTHEAST OF THE CENTER OF A CONCRETE DITCH, 20.9 M (68.6 FT)
GC2720'SOUTHWEST OF THE SOUTHWEST EDGE OF INTERSTATE 24 AND 0.3 M (1.0 FT)
GC2720'NORTHWEST OF A FIBERGLASS WITNESS POST.
GC2720
GC2720                          STATION RECOVERY (1991)
GC2720
GC2720'RECOVERED 1991
GC2720'RECOVERED IN GOOD CONDITION.
GC2720
GC2720                          STATION RECOVERY (1993)
GC2720
GC2720'RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1993 (DMM)
GC2720'RECOVERED AS DESCRIBED.
GC2720
GC2720                          STATION RECOVERY (1995)
GC2720
GC2720'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995 (CFS)
GC2720'THE STATION IS LOCATED ABOUT 43.5 KM (27.00 MI) NORTHWEST OF
GC2720'NASHVILLE, 24.1 KM (14.95 MI) EAST-SOUTHEAST OF CLARKSVILLE, AT THE
GC2720'JUNCTION OF INTERSTATE HIGHWAY 24 AND STATE ROUTE 256 (EXIT 19), IN
GC2720'THE SOUTHEAST QUADRANT OF THE INTERCHANGE.  OWNERSHIP--HIGHWAY
GC2720'RIGHT-OF-WAY.  LOCATED 124.3 M (407.8 FT) SOUTHEAST FROM THE SOUTHEAST
GC2720'CORNER OF THE OVERPASS BRIDGE, 20.9 M (68.6 FT) SOUTHWEST FROM THE
GC2720'SOUTHWEST EDGE OF THE EASTBOUND INTERSTATE HIGHWAY 24 PAVEMENT, 86.6 M
GC2720'(284.1 FT) NORTHEAST FROM A CULVERT HEADWALL UNDER THE ENTRANCE RAMP,
GC2720'30.6 M (100.4 FT) NORTHEAST FROM THE CENTER OF A CONCRETE DITCH, 0.3 M
GC2720'(1.0 FT) NORTHWEST FROM A FIBERGLASS WITNESS POST.  A STEEL SPIKE IS
GC2720'SET IN THE CONCRETE.
GC2720
GC2720                          STATION RECOVERY (1997)
GC2720'RECOVERY NOTE BY TN DEPT OF TRANSP 1997 (JM)
GC2720'RECOVERED AS DESCRIBED.
GC2720
GC2720                          STATION RECOVERY (2003)
GC2720'RECOVERY NOTE BY TN DEPT OF TRANSP 2003
GC2720'RECOVERED AS DESCRIBED.
GC2720
GC2720                          STATION RECOVERY (2008)
GC2720'RECOVERY NOTE BY TENNESSEE DEPT. OF 2008 (JTZ)
GC2720'RECOVERED AS DESCRIBED
National Geodetic Survey,   Retrieval Date = APRIL  8, 2022
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FD1646 ***********************************************************************
FD1646  CBN         -  This is a Cooperative Base Network Control Station.
FD1646  DESIGNATION -  GPS 27
FD1646  PID         -  FD1646
FD1646  STATE/COUNTY-  TN/WILLIAMSON
FD1646  COUNTRY     -  US
FD1646  USGS QUAD   -  FRANKLIN (2019)
FD1646
FD1646                        *CURRENT SURVEY CONTROL
FD1646  ______________________________________________________________________
FD1646* NAD 83(2011) POSITION- 35 57 56.80765(N) 086 48 18.24555(W)   ADJUSTED
FD1646* NAD 83(2011) ELLIP HT-   195.354 (meters)        (06/27/12)   ADJUSTED
FD1646* NAD 83(2011) EPOCH   -  2010.00
FD1646* NAVD 88 ORTHO HEIGHT -   224.23  (meters)      735.7   (feet) N HEIGHT
FD1646  ______________________________________________________________________
FD1646  GEOID HEIGHT    -        -28.860 (meters)                     GEOID18
FD1646  NAD 83(2011) X  -    288,050.718 (meters)                     COMP
FD1646  NAD 83(2011) Y  - -5,160,354.569 (meters)                     COMP
FD1646  NAD 83(2011) Z  -  3,725,233.890 (meters)                     COMP
FD1646  LAPLACE CORR    -         -0.74  (seconds)                    DEFLEC18
FD1646  DYNAMIC HEIGHT  -        224.04  (meters)      735.0   (feet) COMP
FD1646  MODELED GRAVITY -    979,751.0   (mgal)                       NAVD 88
FD1646
FD1646  VERT ORDER      -  THIRD
FD1646
FD1646  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
FD1646  Standards:
FD1646         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
FD1646            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
FD1646  ------------------------------------------------------------------
FD1646  NETWORK    0.59   1.45           0.25   0.23   0.74      0.03054144
FD1646  ------------------------------------------------------------------
FD1646  Click here for local accuracies and other accuracy information.
FD1646
FD1646
FD1646.The horizontal coordinates were established by GPS observations
FD1646.and adjusted by the National Geodetic Survey in June 2012.
FD1646
FD1646.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
FD1646.been affixed to the stable North American tectonic plate. See
FD1646.NA2011 for more information.
FD1646
FD1646.The horizontal coordinates are valid at the epoch date displayed above
FD1646.which is a decimal equivalence of Year/Month/Day.
FD1646
FD1646.The orthometric height was determined by differential leveling
FD1646.and adjusted by the NATIONAL GEODETIC SURVEY in August 1996.
FD1646
FD1646.The height was determined by precise leveling from only one NSRS
FD1646.bench mark.  This was not adequate "tie leveling" to NSRS and was
FD1646.allowed ONLY to validate the GPS-derived height.
FD1646
FD1646.Significant digits in the geoid height do not necessarily reflect accuracy.
FD1646.GEOID18 height accuracy estimate available here.
FD1646
FD1646.Click photographs - Photos may exist for this station.
FD1646
FD1646.The X, Y, and Z were computed from the position and the ellipsoidal ht.
FD1646
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FD1646.The Laplace correction was computed from DEFLEC18 derived deflections.
FD1646
FD1646.The ellipsoidal height was determined by GPS observations
FD1646.and is referenced to NAD 83.
FD1646
FD1646.The dynamic height is computed by dividing the NAVD 88
FD1646.geopotential number by the normal gravity value computed on the
FD1646.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
FD1646.degrees latitude (g = 980.6199 gals.).
FD1646
FD1646.The modeled gravity was interpolated from observed gravity values.
FD1646
FD1646. The following values were computed from the NAD 83(2011) position.
FD1646
FD1646;                    North         East     Units Scale Factor Converg.
FD1646;SPC TN       -   181,417.279   527,385.109   MT  0.99995103   -0 28 16.7
FD1646;SPC TN       -   595,199.86  1,730,262.65   sFT  0.99995103   -0 28 16.7
FD1646;UTM  16      - 3,980,170.515   517,576.336   MT  0.99960381   +0 06 52.1
FD1646
FD1646!             -  Elev Factor  x  Scale Factor =   Combined Factor
FD1646!SPC TN       -   0.99996934  x   0.99995103  =   0.99992037
FD1646!UTM  16      -   0.99996934  x   0.99960381  =   0.99957316
FD1646
FD1646_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SEE1757680170(NAD 83)
FD1646
FD1646                           SUPERSEDED SURVEY CONTROL
FD1646
FD1646  NAD 83(2007)-  35 57 56.80769(N)    086 48 18.24597(W) AD(2002.00) A
FD1646  ELLIP H (10/19/11)  195.356  (m)                       GP(2002.00) 3 1
FD1646  NAD 83(2007)-  35 57 56.80756(N)    086 48 18.24593(W) AD(2002.00) A
FD1646  ELLIP H (10/16/11)  195.287  (m)                       GP(2002.00) 3 2
FD1646  NAD 83(2007)-  35 57 56.80796(N)    086 48 18.24582(W) AD(2002.00) 0
FD1646  ELLIP H (02/10/07)  195.240  (m)                       GP(2002.00)
FD1646  ELLIP H (08/03/04)  195.248  (m)                       GP(       ) 4 1
FD1646  NAD 83(1995)-  35 57 56.80756(N)    086 48 18.24648(W) AD(       ) B
FD1646  ELLIP H (12/14/95)  195.362  (m)                       GP(       ) 1 2
FD1646  NAD 83(1990)-  35 57 56.80915(N)    086 48 18.24961(W) AD(       ) B
FD1646  ELLIP H (09/07/90)  195.313  (m)                       GP(       ) 4 1
FD1646  NAVD 88 (08/03/04)  224.1    (m)  GEOID03 model used   GPS OBS
FD1646  NAVD 88             224.23   (m)          735.7    (f) LEVELING    3
FD1646  NGVD 29 (??/??/??)  224.22   (m)          735.6    (f) N HEIGHT    3
FD1646  NGVD 29             224.22   (m)          735.6    (f) LEVELING    3
FD1646
FD1646.Superseded values are not recommended for survey control.
FD1646
FD1646.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
FD1646.See file dsdata.pdf to determine how the superseded data were derived.
FD1646
FD1646_MARKER: DH = HORIZONTAL CONTROL DISK
FD1646_SETTING: 66 = SET IN ROCK OUTCROP
FD1646_STAMPING: GPS 27 1987
FD1646_MARK LOGO: NGS
FD1646_MAGNETIC: N = NO MAGNETIC MATERIAL
FD1646_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
FD1646+STABILITY: POSITION/ELEVATION WELL
FD1646_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
FD1646+SATELLITE: SATELLITE OBSERVATIONS - May 18, 2016
FD1646
FD1646  HISTORY     - Date     Condition        Report By
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FD1646  HISTORY     - 1987     MONUMENTED       NGS
FD1646  HISTORY     - 19930416 GOOD             NOS
FD1646  HISTORY     - 19950612 GOOD             NGS
FD1646  HISTORY     - 20030217 GOOD             INDIV
FD1646  HISTORY     - 20031010 GOOD             TNDT
FD1646  HISTORY     - 20050720 GOOD             JCLS
FD1646  HISTORY     - 20061226 GOOD             INDIV
FD1646  HISTORY     - 20081110 GOOD             TNDOT
FD1646  HISTORY     - 20100214 GOOD             GEOCAC
FD1646  HISTORY     - 20110321 GOOD             NOGUCO
FD1646  HISTORY     - 20160518 GOOD             INDIV
FD1646
FD1646                          STATION DESCRIPTION
FD1646
FD1646'DESCRIBED BY NATIONAL GEODETIC SURVEY 1987 (DAC)
FD1646'THE STATION IS LOCATED ABOUT 23 KM (14 MI) SOUTH OF NASHVILLE,
FD1646'0.2 KM (0.15 MI) EAST OF THE JUNCTION OF INTERSTATE 65 AND MOORES
FD1646'LANE.
FD1646'OWNERSHIP--ROAD RIGHT-OF-WAY.
FD1646'
FD1646'THE STATION IS LOCATED 0.2 KM (0.15 MI) EAST OF THE JUNCTION OF
FD1646'INTERSTATE 65 AND MOORES LANE ON THE SOUTH RIGHT-OF-WAY OF MOORES
FD1646'LANE.
FD1646'
FD1646'THE STATION IS A STANDARD NGS DISK
FD1646'STAMPED---GPS 27 1987---,
FD1646'SET INTO A DRILL HOLE IN BEDROCK OUTCROP LEVEL WITH GROUND.  LOCATED
FD1646'17.4 METERS (57 FT) SOUTH FROM THE CENTER OF EASTBOUND MOORES LANE
FD1646'AND 0.3 METERS (1 FT) ABOVE SAME,
FD1646'10.46 METERS (34.3 FT) NORTH FROM A FIBERGLASS WITNESS POST AT THE
FD1646'SOUTH RIGHT-OF-WAY FENCE,
FD1646'53.0 METERS (174 FT) EAST FROM THE EAST END OF THE SOUTH HEADWALL
FD1646'OF A CULVERT UNDER MOORES LANE,
FD1646'19.5 METERS (64 FT) WEST-SOUTHWEST FROM THE WEST HEADWALL OF A
FD1646'CULVERT UNDER A SIDE ROAD,
FD1646'20.7 METERS (68 FT) WEST-NORTHWEST FROM A UTILITY POLE NUMBERED 35
FD1646'WITH A TRANSFORMER AND ONE GUY WIRE.
FD1646
FD1646                          STATION RECOVERY (1993)
FD1646
FD1646'RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1993 (DMM)
FD1646'DUE TO CHANGES A NEW DESCRIPTION FOLLOWS. STATION IS LOCATED ABOUT 14
FD1646'MI (22.5 KM) SOUTH OF NASHVILLE,TN, SOUTH OF BRENTWOOD AND NORTH OF
FD1646'FRANKLIN,TN JUST EAST OF THE INTERSECTION OF INTERSTATE HIGHWAY 65 AND
FD1646'MOORES LANE (EXIT 69). TO REACH FROM I-65 TAKE EXIT 69 (MOORES LANE)
FD1646'EAST 0.15 MI (0.24 KM) FROM THE CENTER OF THE BRIDGE OVER THE
FD1646'INTERSTATE TO THE STATION ALONG THE SOUTH RIGHT OF WAY FOR MOORES
FD1646'LANE.  ALTERNATIVELY 0.1 MI (0.2 KM) WEST OF THE INTERSECTION OF
FD1646'MOORES LANE AND LIBERTY ROAD. IT IS 103 FT (31.4 M) ENE OF THE CENTER
FD1646'OF A MANHOLE COVER (TELEPHONE ACCESS) EAST OF THE WEST END OF THE
FD1646'RIGHT OF WAY FENCE, 68.7 FT (20.9 M) WNW OF A UTILITY POLE (NUMBER 35)
FD1646'AT THE EAST END OF THE FENCE, 64 FT (19.5 M) WSW OF THE WEST HEADWALL
FD1646'OF A CULVERT UNDER A SIDE ROAD (UNNAMED), 57 FT (17.4 M) SOUTH OF THE
FD1646'CENTER OF THE EASTBOUND LANES OF MOORES LANE AND 34 FT (10.4 M) NORTH
FD1646'OF A FIBERGLASS WITNESS SIGN ADJACENT TO THE FENCE.
FD1646
FD1646                          STATION RECOVERY (1995)
FD1646
FD1646'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995 (CFS)
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FD1646'THE STATION IS LOCATED ABOUT 23 KM (14.30 MI) SOUTH OF NASHVILLE, 0.24
FD1646'KM (0.15 MI) EAST OF THE JUNCTION OF INTERSTATE HIGHWAY 65 AND MOORES
FD1646'LANE, ON THE SOUTH RIGHT-OF-WAY OF MOORES LANE, NORTH OF THE PARKING
FD1646'LOT FOR THE OUTBACK STEAK HOUSE.  OWNERSHIP--ROAD RIGHT-OF-WAY.  TO
FD1646'REACH THE STATION FROM THE JUNCTION OF INTERSTATE HIGHWAY 65 AND
FD1646'MOORES LANE (EXIT 69), GO EAST ON MOORES LANE FOR 0.15 MI (0.24 KM) TO
FD1646'THE STATION ON THE RIGHT.  THE STATION IS SET INTO A DRILL HOLE IN THE
FD1646'TOP OF ROCK OUTCROP FLUSH WITH GROUND.  LOCATED 149.0 FT (45.4 M)
FD1646'EAST-SOUTHEAST FROM THE CENTER OF A HEADWALL OF A CULVERT UNDER THE
FD1646'EXIT RAMP FROM NORTHBOUND INTERSTATE HIGHWAY 65, 138.2 FT (42.1 M)
FD1646'EAST FROM UTILITY POLE NUMBER 29-3537 WITH TRANSFORMER AND 3 GUY
FD1646'WIRES, 104.5 FT (31.9 M) NORTH-NORTHEAST OF THE NORTHEAST CORNER OF
FD1646'THE CONCRETE PORCH OF THE OUTBACK STEAK HOUSE, 68.3 FT (20.8 M)
FD1646'WEST-NORTHWEST FROM UTILITY POLE NUMBER 35 WITH ONE GUY WIRE, 65.0 FT
FD1646'(19.8 M) WEST-SOUTHWEST FROM THE WEST HEADWALL OF A CULVERT UNDER A
FD1646'SIDE ROAD, 57.0 FT (17.4 M) SOUTH FROM THE CENTER OF THE EASTBOUND
FD1646'LANES OF MOORES LANE, 34.6 FT (10.5 M) NORTH FROM A FIBERGLASS WITNESS
FD1646'POST AND 1 FT (0.3 M) HIGHER THAN MOORES LANE.
FD1646
FD1646                          STATION RECOVERY (2003)
FD1646
FD1646'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2003 (SWC)
FD1646'RECOVERED IN GOOD CONDITION.
FD1646
FD1646                          STATION RECOVERY (2003)
FD1646
FD1646'RECOVERY NOTE BY TN DEPT OF TRANSP 2003
FD1646'RECOVERED AS DESCRIBED.
FD1646
FD1646                          STATION RECOVERY (2005)
FD1646
FD1646'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2005
FD1646'RECOVERED IN GOOD CONDITION.
FD1646
FD1646                          STATION RECOVERY (2006)
FD1646
FD1646'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2006 (RSE)
FD1646'RECOVERED IN GOOD CONDITION.
FD1646
FD1646                          STATION RECOVERY (2008)
FD1646
FD1646'RECOVERY NOTE BY TENNESSEE DEPT. OF 2008 (JTZ)
FD1646'RECOVERED AS DESCRIBED
FD1646
FD1646                          STATION RECOVERY (2010)
FD1646
FD1646'RECOVERY NOTE BY GEOCACHING 2010 (TLM)
FD1646'RECOVERED IN GOOD CONDITION
FD1646
FD1646                          STATION RECOVERY (2011)
FD1646
FD1646'RECOVERY NOTE BY NORTHROP GRUMMAN CORPORATION 2011 (CLR)
FD1646'RECOVERED IN GOOD CONDITION.
FD1646
FD1646                          STATION RECOVERY (2016)
FD1646'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2016 (BGS)
FD1646'RECOVERED IN GOOD CONDITION
National Geodetic Survey,   Retrieval Date = APRIL  8, 2022
GC2724 ***********************************************************************
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GC2724  CBN          -  This is a Cooperative Base Network Control Station.
GC2724  DESIGNATION  -  GPS 28
GC2724  PID          -  GC2724
GC2724  STATE/COUNTY-  TN/DICKSON
GC2724  COUNTRY      -  US
GC2724  USGS QUAD    -  BURNS (2019)
GC2724
GC2724                        *CURRENT SURVEY CONTROL
GC2724  ______________________________________________________________________
GC2724* NAD 83(2011) POSITION- 36 01 09.46674(N) 087 15 23.50167(W)   ADJUSTED
GC2724* NAD 83(2011) ELLIP HT-   184.552 (meters)        (06/27/12)   ADJUSTED
GC2724* NAD 83(2011) EPOCH    -  2010.00
GC2724* NAVD 88 ORTHO HEIGHT -   213.258 (meters)      699.66  (feet) ADJUSTED
GC2724  ______________________________________________________________________
GC2724  GEOID HEIGHT    -        -28.702 (meters)                     GEOID18
GC2724  NAD 83(2011) X  -    247,213.912 (meters)                     COMP
GC2724  NAD 83(2011) Y  - -5,158,969.491 (meters)                     COMP
GC2724  NAD 83(2011) Z  -  3,730,032.180 (meters)                     COMP
GC2724  LAPLACE CORR    -         -0.52  (seconds)                    DEFLEC18
GC2724  DYNAMIC HEIGHT  -        213.072 (meters)      699.05  (feet) COMP
GC2724  MODELED GRAVITY -    979,758.6   (mgal)                       NAVD 88
GC2724
GC2724  VERT ORDER      -  THIRD
GC2724
GC2724  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
GC2724  Standards:
GC2724         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
GC2724            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
GC2724  ------------------------------------------------------------------
GC2724  NETWORK    0.44   1.04           0.19   0.17   0.53     -0.03098859
GC2724  ------------------------------------------------------------------
GC2724  Click here for local accuracies and other accuracy information.
GC2724
GC2724
GC2724.The horizontal coordinates were established by GPS observations
GC2724.and adjusted by the National Geodetic Survey in June 2012.
GC2724
GC2724.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
GC2724.been affixed to the stable North American tectonic plate. See
GC2724.NA2011 for more information.
GC2724
GC2724.The horizontal coordinates are valid at the epoch date displayed above
GC2724.which is a decimal equivalence of Year/Month/Day.
GC2724
GC2724.The orthometric height was determined by differential leveling and
GC2724.adjusted by the NATIONAL GEODETIC SURVEY
GC2724.in August 1996.
GC2724
GC2724.Significant digits in the geoid height do not necessarily reflect accuracy.
GC2724.GEOID18 height accuracy estimate available here.
GC2724
GC2724.Click photographs - Photos may exist for this station.
GC2724
GC2724.The X, Y, and Z were computed from the position and the ellipsoidal ht.
GC2724
GC2724.The Laplace correction was computed from DEFLEC18 derived deflections.
GC2724
GC2724.The ellipsoidal height was determined by GPS observations
GC2724.and is referenced to NAD 83.
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GC2724
GC2724.The dynamic height is computed by dividing the NAVD 88
GC2724.geopotential number by the normal gravity value computed on the
GC2724.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
GC2724.degrees latitude (g = 980.6199 gals.).
GC2724
GC2724.The modeled gravity was interpolated from observed gravity values.
GC2724
GC2724. The following values were computed from the NAD 83(2011) position.
GC2724
GC2724;                    North         East     Units Scale Factor Converg.
GC2724;SPC TN       -   187,783.512   486,742.752   MT  0.99995361   -0 44 08.2
GC2724;SPC TN       -   616,086.41  1,596,921.85   sFT  0.99995361   -0 44 08.2
GC2724;UTM  16      - 3,986,119.130   476,885.329   MT  0.99960658   -0 09 03.1
GC2724
GC2724!             -  Elev Factor  x  Scale Factor =   Combined Factor
GC2724!SPC TN       -   0.99997104  x   0.99995361  =   0.99992465
GC2724!UTM  16      -   0.99997104  x   0.99960658  =   0.99957763
GC2724
GC2724_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SDE7688586119(NAD 83)
GC2724
GC2724                           SUPERSEDED SURVEY CONTROL
GC2724
GC2724  NAD 83(2007)-  36 01 09.46649(N)    087 15 23.50229(W) AD(2002.00) A
GC2724  ELLIP H (10/16/11)  184.576  (m)                       GP(2002.00) 3 2
GC2724  NAD 83(2007)-  36 01 09.46683(N)    087 15 23.50223(W) AD(2002.00) 0
GC2724  ELLIP H (02/10/07)  184.565  (m)                       GP(2002.00)
GC2724  ELLIP H (08/03/04)  184.551  (m)                       GP(       ) 4 1
GC2724  NAD 83(1995)-  36 01 09.46654(N)    087 15 23.50236(W) AD(       ) B
GC2724  ELLIP H (12/14/95)  184.562  (m)                       GP(       ) 1 2
GC2724  NAD 83(1990)-  36 01 09.46799(N)    087 15 23.50593(W) AD(       ) B
GC2724  ELLIP H (09/07/90)  184.521  (m)                       GP(       ) 4 1
GC2724  NAVD 88             213.26   (m)          699.7    (f) LEVELING    3
GC2724  NGVD 29             213.25   (m)          699.6    (f) LEVELING    3
GC2724
GC2724.Superseded values are not recommended for survey control.
GC2724
GC2724.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
GC2724.See file dsdata.pdf to determine how the superseded data were derived.
GC2724
GC2724_MARKER: I = METAL ROD
GC2724_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
GC2724_STAMPING: GPS 28 1987
GC2724_MARK LOGO: NGS
GC2724_PROJECTION: FLUSH
GC2724_MAGNETIC: S = STEEL SPIKE IMBEDDED IN MONUMENT
GC2724_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
GC2724_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
GC2724+SATELLITE: SATELLITE OBSERVATIONS - December 09, 2008
GC2724_ROD/PIPE-DEPTH: 5.50 meters
GC2724_SLEEVE-DEPTH  : 0.90 meters
GC2724
GC2724  HISTORY     - Date     Condition        Report By
GC2724  HISTORY     - 1987     MONUMENTED       NGS
GC2724  HISTORY     - 19890720 GOOD
GC2724  HISTORY     - 19950613 GOOD             NGS
GC2724  HISTORY     - 20031010 GOOD             TNDT
GC2724  HISTORY     - 20081209 GOOD             TNDOT
GC2724
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GC2724                          STATION DESCRIPTION
GC2724
GC2724'DESCRIBED BY NATIONAL GEODETIC SURVEY 1987 (DAC)
GC2724'THE STATION IS LOCATED ABOUT 12.9 KM (8 MI) EAST-SOUTHEAST OF
GC2724'DICKSON, IN THE MEDIAN OF INTERSTATE 40,
GC2724'8.2 KM (5.1 MI) WEST OF STATE ROUTE 96 (EXIT 182),
GC2724'7.4 KM (4.6 MI) EAST OF STATE ROUTE 46 (EXIT 172).
GC2724'OWNERSHIP--FEDERAL RIGHT-OF-WAY.
GC2724'
GC2724'TO REACH THE STATION FROM THE JUNCTION OF STATE ROUTE 96 AND
GC2724'INTERSTATE 40 GO WEST FOR 7.1 KM (4.4 MI) ON INTERSTATE 40 TO A
GC2724'BRIDGE OVER A CREEK.  CONTINUE STRAIGHT AHEAD AND GO WEST AND
GC2724'UPHILL FOR 1.1 KM (0.7 MI) ON INTERSTATE 40 TO A LOW CUT AND A 0.2
GC2724'KM (0.1 MI) GAP IN THE GUARDRAIL ON THE LEFT AND THE STATION ON THE
GC2724'LEFT.
GC2724'
GC2724'THE STATION IS A 3-D MARK WITH STAINLESS STEEL ROD DRIVEN 5.5 METERS
GC2724'(18 FT).  THE LOGO CAP IS STAMPED---GPS 28 1987---, AND A STEEL
GC2724'SPIKE IS EMBEDDED IN THE CONCRETE.  LOCATED
GC2724'19.1 METERS (62.5 FT) SOUTH FROM THE EDGE OF THE PAVEMENT OF THE
GC2724'WESTBOUND LANES,
GC2724'48.2 METERS (158 FT) NORTH FROM THE EDGE OF THE PAVEMENT OF THE
GC2724'EASTBOUND LANES,
GC2724'77.1 METERS (253 FT) WEST-SOUTHWEST FROM THE WEST END OF A
GC2724'GUARDRAIL,
GC2724'56.7 METERS (186 FT) EAST-SOUTHEAST FROM THE EAST END OF A
GC2724'GUARDRAIL,
GC2724'0.34 METERS (1.1 FT) NORTHEAST FROM A FIBERGLASS WITNESS POST.
GC2724
GC2724                          STATION RECOVERY (1989)
GC2724
GC2724'RECOVERED 1989
GC2724'RECOVERED IN GOOD CONDITION.
GC2724
GC2724                          STATION RECOVERY (1995)
GC2724
GC2724'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995 (CFS)
GC2724'THE STATION IS LOCATED ABOUT 12.9 KM (8.00 MI) EAST-SOUTHEAST OF
GC2724'DICKSON, IN THE MEDIAN OF INTERSTATE HIGHWAY 40, 7.4 KM (4.60 MI) WEST
GC2724'OF STATE ROUTE 96 (EXIT 182), 7.4 KM (4.60 MI) EAST OF STATE ROUTE 46
GC2724'(EXIT 172).  OWNERSHIP--FEDERAL RIGHT-OF-WAY.  TO REACH THE STATION
GC2724'FROM THE JUNCTION OF STATE ROUTE 96 AND INTERSTATE HIGHWAY 40, ABOUT
GC2724'40 KM (24.85 MI) WEST-SOUTHWEST OF NASHVILLE, GO WEST FOR 6.5 KM (4.05
GC2724'MI) ON INTERSTATE HIGHWAY 40 TO A BRIDGE OVER A CREEK. CONTINUE
GC2724'STRAIGHT AHEAD AND GO WEST AND UPHILL FOR 1.0 KM (0.60 MI) ON
GC2724'INTERSTATE HIGHWAY 40 TO A LOW CUT, A 0.16 KM (0.10 MI) GAP IN THE
GC2724'GUARDRAIL ON THE LEFT AND THE STATION ON THE LEFT, JUST BEFORE
GC2724'REACHING MILEPOST 177.  LOCATED 19.1 M (62.7 FT) SOUTH FROM THE EDGE
GC2724'OF THE PAVEMENT OF THE WESTBOUND LANES, 48.2 M (158.1 FT) NORTH FROM
GC2724'THE EDGE OF THE PAVEMENT OF THE EASTBOUND LANES, 77.1 M (253.0 FT)
GC2724'WEST-SOUTHWEST FROM THE WEST END OF A GUARDRAIL, 56.7 M (186.0 FT)
GC2724'EAST-SOUTHEAST FROM THE EAST END OF A GUARDRAIL AND 0.34 M (1.12 FT)
GC2724'NORTHEAST FROM A FIBERGLASS WITNESS POST.  A STEEL SPIKE IS EMBEDDED
GC2724'IN THE CONCRETE.
GC2724
GC2724                          STATION RECOVERY (2003)
GC2724
GC2724'RECOVERY NOTE BY TN DEPT OF TRANSP 2003
GC2724'RECOVERED AS DESCRIBED.
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GC2724
GC2724                          STATION RECOVERY (2008)
GC2724
GC2724'RECOVERY NOTE BY TENNESSEE DEPT. OF 2008 (JTZ)
GC2724'DESCRIPTION IS ADEQUATE
GC2724'(5.5 FT) ABOVE PAVEMENT
GC2724'57.2 M (187.8 FT.) EAST-SOUTHEAST FROM THE EAST END OF A GUARDRAIL
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National Geodetic Survey,   Retrieval Date = APRIL  8, 2022
DG7697 ***********************************************************************
DG7697  CBN         -  This is a Cooperative Base Network Control Station.
DG7697  DESIGNATION -  REGION
DG7697  PID         -  DG7697
DG7697  STATE/COUNTY-  TN/DAVIDSON
DG7697  COUNTRY     -  US
DG7697  USGS QUAD   -  NASHVILLE WEST (2019)
DG7697
DG7697                        *CURRENT SURVEY CONTROL
DG7697
DG7697* NAD 83(2011) POSITION- 36 10 07.72428(N) 086 52 22.46519(W)   ADJUSTED
DG7697* NAD 83(2011) ELLIP HT-    96.100 (meters)        (06/27/12)   ADJUSTED
DG7697* NAD 83(2011) EPOCH   -  2010.00
DG7697* NAVD 88 ORTHO HEIGHT -   125.4   (meters)      411.    (feet) GPS OBS
DG7697
DG7697  NAVD 88 orthometric height was determined with geoid model    GEOID03
DG7697  GEOID HEIGHT    -        -29.307 (meters)                     GEOID03
DG7697  GEOID HEIGHT    -        -29.380 (meters)                     GEOID18
DG7697  NAD 83(2011) X  -    281,212.684 (meters)                     COMP
DG7697  NAD 83(2011) Y  - -5,147,368.016 (meters)                     COMP
DG7697  NAD 83(2011) Z  -  3,743,386.258 (meters)                     COMP
DG7697  LAPLACE CORR    -         -0.44  (seconds)                    DEFLEC18
DG7697
DG7697  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
DG7697  Standards:
DG7697         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
DG7697            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
DG7697  ------------------------------------------------------------------
DG7697  NETWORK    0.72   1.57           0.32   0.26   0.80     -0.14784452
DG7697  ------------------------------------------------------------------
DG7697  Click here for local accuracies and other accuracy information.
DG7697
DG7697
DG7697.The horizontal coordinates were established by GPS observations
DG7697.and adjusted by the National Geodetic Survey in June 2012.
DG7697
DG7697.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
DG7697.been affixed to the stable North American tectonic plate. See
DG7697.NA2011 for more information.
DG7697
DG7697.The horizontal coordinates are valid at the epoch date displayed above
DG7697.which is a decimal equivalence of Year/Month/Day.
DG7697
DG7697.The orthometric height was determined by GPS observations and a
DG7697.high-resolution geoid model.
DG7697
DG7697.Significant digits in the geoid height do not necessarily reflect accuracy.
DG7697.GEOID18 height accuracy estimate available here.
DG7697
DG7697.Click photographs - Photos may exist for this station.
DG7697
DG7697.The X, Y, and Z were computed from the position and the ellipsoidal ht.
DG7697
DG7697.The Laplace correction was computed from DEFLEC18 derived deflections.
DG7697
DG7697.The ellipsoidal height was determined by GPS observations
DG7697.and is referenced to NAD 83.
DG7697
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DG7697. The following values were computed from the NAD 83(2011) position.
DG7697
DG7697;                    North         East     Units Scale Factor Converg.
DG7697;SPC TN       -   203,996.398   521,467.323   MT  0.99996542   -0 30 39.7
DG7697;SPC TN       -   669,278.18  1,710,847.38   sFT  0.99996542   -0 30 39.7
DG7697;UTM  16      - 4,002,679.951   511,430.131   MT  0.99960161   +0 04 30.0
DG7697
DG7697!             -  Elev Factor  x  Scale Factor =   Combined Factor
DG7697!SPC TN       -   0.99998492  x   0.99996542  =   0.99995034
DG7697!UTM  16      -   0.99998492  x   0.99960161  =   0.99958653
DG7697
DG7697_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SEF1143002679(NAD 83)
DG7697
DG7697                           SUPERSEDED SURVEY CONTROL
DG7697
DG7697  NAD 83(2007)-  36 10 07.72410(N)    086 52 22.46589(W) AD(2002.00) A
DG7697  ELLIP H (10/16/11)   96.117  (m)                       GP(2002.00) 3 2
DG7697  NAD 83(2007)-  36 10 07.72456(N)    086 52 22.46575(W) AD(2002.00) 0
DG7697  ELLIP H (02/10/07)   96.107  (m)                       GP(2002.00)
DG7697  NAD 83(1995)-  36 10 07.72447(N)    086 52 22.46573(W) AD(       ) A
DG7697  ELLIP H (08/03/04)   96.091  (m)                       GP(       ) 4 1
DG7697
DG7697.Superseded values are not recommended for survey control.
DG7697
DG7697.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DG7697.See file dsdata.pdf to determine how the superseded data were derived.
DG7697
DG7697_MARKER: DD = SURVEY DISK
DG7697_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
DG7697_STAMPING: REGION 2000
DG7697_MARK LOGO: TNDT
DG7697_MAGNETIC: N = NO MAGNETIC MATERIAL
DG7697_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
DG7697+STABILITY: SURFACE MOTION
DG7697_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DG7697+SATELLITE: SATELLITE OBSERVATIONS - March 22, 2011
DG7697
DG7697  HISTORY     - Date     Condition        Report By
DG7697  HISTORY     - 2000     MONUMENTED       TNDT
DG7697  HISTORY     - 20110322 GOOD             NOGUCO
DG7697
DG7697                            STATION DESCRIPTION
DG7697
DG7697'DESCRIBED BY TN DEPT OF TRANSP 2000
DG7697'THE STATION IS LOCATED ON THE TDOT REGION 3 COMPLEX ON CENTENNIAL
DG7697'BOULEVARD IN NASHVILLE IN A U-SHAPED GRASS ISLAND DIRECTLY ACROSS THE
DG7697'PARKING LOT FROM THE BACK DOOR OF THE REGIONAL SURVEY FIELD OFFICE. IT
DG7697'IS LOCATED 15 FT N OF THE CONCRETE BASE OF A METAL LIGHT POLE, 3.3 FT
DG7697'W OF THE BACK OF CURB ON THE EAST SIDE OF THE ISLAND, 3.4 FT E OF THE
DG7697'BACK OF CURB ON THE WEST SIDE OF THE ISLAND, AND 4.0 FT S OF THE BACK
DG7697'OF THE CURB IN THE -U- OF THE ISLAND.
DG7697'
DG7697'STANDARD TDOT ALUMINUM SURVEY MARKER SET IN THE TOP OF A 12-INCH BY
DG7697'12-INCH CONCRETE MONUMENT SET FLUSH WITH THE GROUND.  DISK IS STAMPED
DG7697'REGION 2000.
DG7697
DG7697                            STATION RECOVERY (2011)
DG7697'RECOVERY NOTE BY NORTHROP GRUMMAN CORPORATION 2011 (CLR)
DG7697'RECOVERED IN GOOD CONDITION.
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National Geodetic Survey, Retrieval Date = APRIL 8, 2022

GC0538 ***
GC0538 DESIGNATION - SULPHER RM 2
GC0538 PID   - GC0538
GC0538 STATE/COUNTY- TN/ROBERTSON
GC0538 COUNTRY   - US
GC0538 USGS QUAD   - WHITE HOUSE (2019)
GC0538
GC0538   *CURRENT SURVEY CONTROL
GC0538
GC0538* NAD 83(2011) POSITION- 36 27 15.83479(N) 086 41 50.27158(W)   NO CHECK
GC0538* NAD 83(2011) ELLIP HT-   235.227 (meters)   (06/27/12)   NO CHECK
GC0538* NAD 83(2011) EPOCH   - 2010.00
GC0538* NAVD 88 ORTHO HEIGHT -   264.869 (meters)   868.99 (feet) ADJUSTED
GC0538
GC0538 GEOID HEIGHT   -   -29.685 (meters)   GEOID18
GC0538 NAD 83(2011) X -   295,913.118 (meters)   COMP
GC0538 NAD 83(2011) Y - -5,127,858.476 (meters)   COMP
GC0538 NAD 83(2011) Z - 3,769,005.365 (meters)   COMP
GC0538 LAPLACE CORR   -   0.31 (seconds)   DEFLEC18
GC0538 DYNAMIC HEIGHT -   264.644 (meters)   868.25 (feet) COMP
GC0538 MODELED GRAVITY -   979,776.0   (mgal)   NAVD 88
GC0538
GC0538 VERT ORDER   - SECOND   CLASS 0
GC0538
GC0538 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
GC0538 Standards:
GC0538   FGDC (95% conf, cm)   Standard deviation (cm)   CorrNE
GC0538   Horiz Ellip   SD_N   SD_E   SD_h   (unitless)
GC0538 --
GC0538 NETWORK   0.94   4.55   0.37   0.40   2.32   -0.03663462
GC0538 --
GC0538 Click here for local accuracies and other accuracy information.
GC0538
GC0538
GC0538.The horizontal coordinates were established by GPS observations
GC0538.and adjusted by the National Geodetic Survey in June 2012.
GC0538
GC0538.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
GC0538.been affixed to the stable North American tectonic plate. See
GC0538.NA2011 for more information.
GC0538
GC0538.The horizontal coordinates are valid at the epoch date displayed above
GC0538.which is a decimal equivalence of Year/Month/Day.
GC0538
GC0538.No horizontal observational check was made to the station.
GC0538.
GC0538.The orthometric height was determined by differential leveling and
GC0538.adjusted by the NATIONAL GEODETIC SURVEY
GC0538.in June 1991.
GC0538
GC0538.Significant digits in the geoid height do not necessarily reflect accuracy.
GC0538.GEOID18 height accuracy estimate available here.
GC0538
GC0538.Click photographs - Photos may exist for this station.
GC0538
GC0538.The X, Y, and Z were computed from the position and the ellipsoidal ht.
GC0538
GC0538.The Laplace correction was computed from DEFLEC18 derived deflections.

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GC0538
GC0538.The ellipsoidal height was determined by GPS observations
GC0538.and is referenced to NAD 83.
GC0538
GC0538.The dynamic height is computed by dividing the NAVD 88
GC0538.geopotential number by the normal gravity value computed on the
GC0538.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
GC0538.degrees latitude (g = 980.6199 gals.).
GC0538
GC0538.The modeled gravity was interpolated from observed gravity values.
GC0538
GC0538. The following values were computed from the NAD 83(2011) position.
GC0538
GC0538;                    North         East     Units Scale Factor Converg.
GC0538;SPC TN       -   235,558.367   537,491.820   MT  1.00000691   -0 24 29.6
GC0538;SPC TN       -   772,827.74  1,763,421.08   sFT  1.00000691   -0 24 29.6
GC0538;UTM  16      - 4,034,392.385   527,124.513   MT  0.99960906   +0 10 47.5
GC0538
GC0538!             -  Elev Factor  x  Scale Factor =   Combined Factor
GC0538!SPC TN       -   0.99996308  x   1.00000691  =   0.99996999
GC0538!UTM  16      -   0.99996308  x   0.99960906  =   0.99957216
GC0538
GC0538_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SEF2712434392(NAD 83)
GC0538
GC0538                           SUPERSEDED SURVEY CONTROL
GC0538
GC0538  NAD 83(2007)-  36 27 15.83480(N)    086 41 50.27244(W) AD(2002.00) B
GC0538  ELLIP H (04/30/09)  235.253  (m)                       GP(2002.00) 4 2
GC0538  NAD 83(1995)-  36 27 15.83473(N)    086 41 50.27277(W) AD(       ) B
GC0538  ELLIP H (01/08/07)  235.252  (m)                       GP(       ) 4 2
GC0538  NAVD 88             264.87   (m)          869.0    (f) LEVELING    3
GC0538  NGVD 29 (??/??/92)  264.928  (m)          869.18   (f) ADJ UNCH    2 0
GC0538
GC0538.Superseded values are not recommended for survey control.
GC0538
GC0538.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
GC0538.See file dsdata.pdf to determine how the superseded data were derived.
GC0538
GC0538_MARKER: DR = REFERENCE MARK DISK
GC0538_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
GC0538_STAMPING: SULPHER NO 2 1959
GC0538_MARK LOGO: CGS
GC0538_PROJECTION: FLUSH
GC0538_MAGNETIC: N = NO MAGNETIC MATERIAL
GC0538_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
GC0538+STABILITY: SURFACE MOTION
GC0538_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
GC0538+SATELLITE: SATELLITE OBSERVATIONS - April 18, 2011
GC0538
GC0538  HISTORY     - Date     Condition        Report By
GC0538  HISTORY     - 1959     MONUMENTED       CGS
GC0538  HISTORY     - 1960     GOOD             CGS
GC0538  HISTORY     - 20060712 GOOD             WOOLPT
GC0538  HISTORY     - 20100505 GOOD             JCLS
GC0538  HISTORY     - 20110418 GOOD             JCLS
GC0538
GC0538                            STATION DESCRIPTION
GC0538
GC0538'DESCRIBED BY COAST AND GEODETIC SURVEY 1960
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GC0538'3.6 MI SW FROM WHITE HOUSE.
GC0538'THIS MARK IS LOCATED AT THE SULPHER 1959 STATION SITE, 100.5 FT.
GC0538'SOUTHWEST OF THE STATION MARK, AND 14 FT. NORTH OF A GRAVELED
GC0538'ROAD, A DISK SET IN TOP OF A CONCRETE POST THAT IS FLUSH WITH
GC0538'THE SURFACE OF THE GROUND.
GC0538
GC0538                          STATION RECOVERY (2006)
GC0538
GC0538'RECOVERY NOTE BY WOOLPERT CONSULTANTS 2006 (SML)
GC0538'THIS STATION WAS RECOVERED AS DESCRIBED AND FOUND IN GOOD CONDITION.
GC0538
GC0538                          STATION RECOVERY (2010)
GC0538
GC0538'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2010
GC0538'RECOVERED IN GOOD CONDITION.
GC0538
GC0538                          STATION RECOVERY (2011)
GC0538
GC0538'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2011
GC0538'RECOVERED IN GOOD CONDITION.
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National Geodetic Survey,   Retrieval Date = APRIL  8, 2022
GC1963 ***********************************************************************
GC1963  DESIGNATION -  U 302
GC1963  PID         -  GC1963
GC1963  STATE/COUNTY-  TN/DAVIDSON
GC1963  COUNTRY     -  US
GC1963  USGS QUAD   -  OAK HILL (2019)
GC1963
GC1963                        *CURRENT SURVEY CONTROL
GC1963 ______________________________________________________________________
GC1963* NAD 83(1986) POSITION- 36 02 33.     (N) 086 47 01.     (W)    SCALED
GC1963* NAVD 88 ORTHO HEIGHT -   220.085 (meters)      722.06  (feet) ADJUSTED
GC1963 ______________________________________________________________________
GC1963  GEOID HEIGHT    -        -29.060 (meters)                     GEOID18
GC1963  DYNAMIC HEIGHT  -        219.894 (meters)      721.44  (feet) COMP
GC1963  MODELED GRAVITY -    979,759.1   (mgal)                       NAVD 88
GC1963
GC1963  VERT ORDER      -  FIRST     CLASS II
GC1963
GC1963.The horizontal coordinates were scaled from a map and have
GC1963.an estimated accuracy of +/- 6 seconds.
GC1963.
GC1963.The orthometric height was determined by differential leveling and
GC1963.adjusted by the NATIONAL GEODETIC SURVEY
GC1963.in June 1991.
GC1963
GC1963.Significant digits in the geoid height do not necessarily reflect accuracy.
GC1963.GEOID18 height accuracy estimate available here.
GC1963
GC1963.Click photographs - Photos may exist for this station.
GC1963
GC1963.The dynamic height is computed by dividing the NAVD 88
GC1963.geopotential number by the normal gravity value computed on the
GC1963.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
GC1963.degrees latitude (g = 980.6199 gals.).
GC1963
GC1963.The modeled gravity was interpolated from observed gravity values.
GC1963
GC1963;                    North         East     Units  Estimated Accuracy
GC1963;SPC TN       -   189,910.      529,390.      MT  (+/- 180 meters Scaled)
GC1963
GC1963_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SEE194886(NAD 83)
GC1963
GC1963                           SUPERSEDED SURVEY CONTROL
GC1963
GC1963.No superseded survey control is available for this station.
GC1963
GC1963_MARKER: DV = VERTICAL CONTROL DISK
GC1963_SETTING: 66 = SET IN ROCK OUTCROP
GC1963_STAMPING: U 302 1984
GC1963_MARK LOGO: NGS
GC1963_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
GC1963+STABILITY: POSITION/ELEVATION WELL
GC1963_SATELLITE: THE SITE LOCATION WAS REPORTED AS NOT SUITABLE FOR
GC1963+SATELLITE: SATELLITE OBSERVATIONS - January 09, 2020
GC1963
GC1963  HISTORY     - Date     Condition        Report By
GC1963  HISTORY     - 1984     MONUMENTED       NGS
GC1963  HISTORY     - 20200109 GOOD             CIVIC
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GC1963
GC1963                          STATION DESCRIPTION
GC1963
GC1963'DESCRIBED BY NATIONAL GEODETIC SURVEY 1984
GC1963'1.35 KM (0.85 MI) NE FROM BRENTWOOD.
GC1963'0.25 KM (0.15 MI) WEST ALONG CHURCH STREET FROM THE POST OFFICE IN
GC1963'BRENTWOOD, THENCE 1.1 KM (0.7 MI) NORTHEAST ALONG U.S. HIGHWAY 31 TO
GC1963'THE MARK SET IN ROCK OUTCROP ON THE NORTHWEST SIDE OF THE HIGHWAY,
GC1963'8.68 METERS (28.5 FT) NORTHWEST OF THE CENTERLINE OF THE HIGHWAY,
GC1963'28.04 METERS (92.0 FT) SOUTHWEST OF AND ACROSS THE HIGHWAY FROM HOODS
GC1963'RETREAT HISTORICAL SIGN, 29.87 METERS (98.0 FT) NORTHEAST OF THE
GC1963'CENTER OF THE TOP OF A CONCRETE CULVERT UNDER THE HIGHWAY,
GC1963'17.98 METERS (59.0 FT) NORTHEAST OF A POWERLINE POLE WITH BRAKERS AND
GC1963'STREET LIGHT, AND 0.18 METERS (0.6 FT) NORTHWEST OF THE SOUTHEAST EDGE
GC1963'OF THE ROCK.
GC1963'THE MARK IS 0.46 METERS  SSW FROM A WITNESS POST.
GC1963'THE MARK IS 0.60 M ABOVE HIGHWAY.
GC1963
GC1963                          STATION RECOVERY (2020)
GC1963
GC1963'RECOVERY NOTE BY CIVIC ENGINEERING AND IT, INC 2020 (TMF)
GC1963'THE HOODS RETREAT HISTORICAL SIGN HAS BEEN RELOCATED.  THE MARK IS
GC1963'LOCATED 407.9 FT (124.3 M) SOUTHWEST OF AND ACROSS THE HIGHWAY FROM
GC1963'THE RELOCATED HOODS RETREAT HISTORICAL SIGN.
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National Geodetic Survey,   Retrieval Date = APRIL  8, 2022
GC0451 ***********************************************************************
GC0451  DESIGNATION -  W 171
GC0451  PID         -  GC0451
GC0451  STATE/COUNTY-  TN/DAVIDSON
GC0451  COUNTRY     -  US
GC0451  USGS QUAD   -  NASHVILLE WEST (2019)
GC0451
GC0451                        *CURRENT SURVEY CONTROL
GC0451  ______________________________________________________________________
GC0451* NAD 83(1986) POSITION- 36 08 56.00   (N) 086 48 48.90   (W)   HD_HELD1
GC0451* NAVD 88 ORTHO HEIGHT -   165.002 (meters)      541.34  (feet) ADJUSTED
GC0451  ______________________________________________________________________
GC0451  GEOID HEIGHT    -        -29.336 (meters)                     GEOID18
GC0451  DYNAMIC HEIGHT  -        164.860 (meters)      540.88  (feet) COMP
GC0451  MODELED GRAVITY -    979,770.3   (mgal)                       NAVD 88
GC0451
GC0451  VERT ORDER      -  FIRST     CLASS II
GC0451
GC0451.The horizontal coordinates were determined by differentially corrected
GC0451.hand held GPS observations or other comparable positioning techniques
GC0451.and have an estimated accuracy of +/- 3 meters.
GC0451.
GC0451.The orthometric height was determined by differential leveling and
GC0451.adjusted by the NATIONAL GEODETIC SURVEY
GC0451.in June 1991.
GC0451
GC0451.Significant digits in the geoid height do not necessarily reflect accuracy.
GC0451.GEOID18 height accuracy estimate available here.
GC0451
GC0451.Click photographs - Photos may exist for this station.
GC0451
GC0451.The dynamic height is computed by dividing the NAVD 88
GC0451.geopotential number by the normal gravity value computed on the
GC0451.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
GC0451.degrees latitude (g = 980.6199 gals.).
GC0451
GC0451.The modeled gravity was interpolated from observed gravity values.
GC0451
GC0451;                   North         East     Units  Estimated Accuracy
GC0451;SPC TN       -   201,739.8     526,786.0     MT  (+/- 3 meters HH1 GPS)
GC0451
GC0451_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SEF1676900478(NAD 83)
GC0451
GC0451                           SUPERSEDED SURVEY CONTROL
GC0451
GC0451  NGVD 29 (??/??/92)  165.022  (m)          541.41   (f) ADJ UNCH    1 2
GC0451
GC0451.Superseded values are not recommended for survey control.
GC0451
GC0451.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
GC0451.See file dsdata.pdf to determine how the superseded data were derived.
GC0451
GC0451_MARKER: DB = BENCH MARK DISK
GC0451_SETTING: 31 = SET IN A PAVEMENT SUCH AS STREET, SIDEWALK, CURB, ETC.
GC0451_SP_SET: MONUMENT FOUNDATION
GC0451_STAMPING: W 171 1948
GC0451_MARK LOGO: CGS
GC0451_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
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GC0451
GC0451  HISTORY     - Date     Condition        Report By
GC0451  HISTORY     - 1948     MONUMENTED       CGS
GC0451  HISTORY     - 1960     GOOD             CGS
GC0451  HISTORY     - 19870807 GOOD             LOCSUR
GC0451
GC0451                          STATION DESCRIPTION
GC0451
GC0451'DESCRIBED BY COAST AND GEODETIC SURVEY 1948
GC0451'AT NASHVILLE.
GC0451'AT NASHVILLE, IN CENTENNIAL PARK, ABOUT 58 YARDS SOUTH OF THE
GC0451'SOUTH CORNER OF A REPLICA OF THE PARTHENON, ON THE NORTHWEST
GC0451'SIDE OF A MONUMENT TO THE RAILROAD INDUSTRY, ON THE NORTHEAST
GC0451'SIDE OF THE NORTHWEST STEPS TO THE MONUMENT, AT THE SOUTHWEST END
GC0451'OF A BENCH ON THE MONUMENT INSCRIBED LAW-CHARITY, AND SET
GC0451'HORIZONTALLY IN THE FOUNDATION ABOUT 2 FEET ABOVE THE GROUND.
GC0451
GC0451                          STATION RECOVERY (1960)
GC0451
GC0451'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1960
GC0451'RECOVERED IN GOOD CONDITION.
GC0451
GC0451                          STATION RECOVERY (1987)
GC0451
GC0451'RECOVERY NOTE BY LOCAL SURVEYOR (INDIVIDUAL OR FIRM) 1987 (MG)
GC0451'RECOVERED IN GOOD CONDITION.
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National Geodetic Survey, Retrieval Date = APRIL 8, 2022

GC1967 **
GC1967 DESIGNATION - Y 302
GC1967 PID   - GC1967
GC1967 STATE/COUNTY- TN/DAVIDSON
GC1967 COUNTRY   - US
GC1967 USGS QUAD   - NASHVILLE WEST (2019)
GC1967
GC1967   *CURRENT SURVEY CONTROL
GC1967
GC1967* NAD 83(2011) POSITION- 36 08 15.56387(N) 086 46 44.79827(W)   ADJUSTED
GC1967* NAD 83(2011) ELLIP HT-   143.976 (meters)   (05/03/16)   ADJUSTED
GC1967* NAD 83(2011) EPOCH   - 2010.00
GC1967* NAVD 88 ORTHO HEIGHT -   173.269 (meters)   568.47 (feet) ADJUSTED
GC1967
GC1967 GEOID HEIGHT   -   -29.308 (meters)   GEOID18
GC1967 NAD 83(2011) X -   289,755.595 (meters)   COMP
GC1967 NAD 83(2011) Y - -5,148,975.671 (meters)   COMP
GC1967 NAD 83(2011) Z - 3,740,623.049 (meters)   COMP
GC1967 LAPLACE CORR   -   -0.03 (seconds)   DEFLEC18
GC1967 DYNAMIC HEIGHT -   173.120 (meters)   567.98 (feet) COMP
GC1967 MODELED GRAVITY -   979,771.0   (mgal)   NAVD 88
GC1967
GC1967 VERT ORDER   - FIRST   CLASS II
GC1967
GC1967 Network accuracy estimates per FGDC Geospatial Positioning Accuracy
GC1967 Standards:
GC1967   FGDC (95% conf, cm)   Standard deviation (cm)   CorrNE
GC1967   Horiz Ellip   SD_N   SD_E   SD_h   (unitless)
GC1967 --
GC1967 NETWORK   0.77   2.20   0.32   0.31   1.12   0.02061763
GC1967 --
GC1967 Click here for local accuracies and other accuracy information.
GC1967
GC1967
GC1967.The horizontal coordinates were established by GPS observations
GC1967.and adjusted by the WOOLPERT CONSULTANTS in May 2016.
GC1967
GC1967.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
GC1967.been affixed to the stable North American tectonic plate. See
GC1967.NA2011 for more information.
GC1967
GC1967.The horizontal coordinates are valid at the epoch date displayed above
GC1967.which is a decimal equivalence of Year/Month/Day.
GC1967
GC1967.The orthometric height was determined by differential leveling and
GC1967.adjusted by the NATIONAL GEODETIC SURVEY
GC1967.in June 1991.
GC1967
GC1967.Significant digits in the geoid height do not necessarily reflect accuracy.
GC1967.GEOID18 height accuracy estimate available here.
GC1967
GC1967.Click photographs - Photos may exist for this station.
GC1967
GC1967.The X, Y, and Z were computed from the position and the ellipsoidal ht.
GC1967
GC1967.The Laplace correction was computed from DEFLEC18 derived deflections.
GC1967
GC1967.The ellipsoidal height was determined by GPS observations

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GC1967.and is referenced to NAD 83.
GC1967
GC1967.The dynamic height is computed by dividing the NAVD 88
GC1967.geopotential number by the normal gravity value computed on the
GC1967.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
GC1967.degrees latitude (g = 980.6199 gals.).
GC1967
GC1967.The modeled gravity was interpolated from observed gravity values.
GC1967
GC1967. The following values were computed from the NAD 83(2011) position.
GC1967
GC1967;                    North         East     Units Scale Factor Converg.
GC1967;SPC TN       -   200,468.320   529,878.176   MT  0.99996240   -0 27 22.0
GC1967;SPC TN       -   657,703.15  1,738,441.98   sFT  0.99996240   -0 27 22.0
GC1967;UTM  16      - 3,999,239.353   519,873.593   MT  0.99960487   +0 07 49.0
GC1967
GC1967!             -  Elev Factor  x  Scale Factor =   Combined Factor
GC1967!SPC TN       -   0.99997740  x   0.99996240  =   0.99993980
GC1967!UTM  16      -   0.99997740  x   0.99960487  =   0.99958228
GC1967
GC1967_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SEE1987399239(NAD 83)
GC1967
GC1967                           SUPERSEDED SURVEY CONTROL
GC1967
GC1967.No superseded survey control is available for this station.
GC1967
GC1967_MARKER: DV = VERTICAL CONTROL DISK
GC1967_SETTING: 66 = SET IN ROCK OUTCROP
GC1967_STAMPING: Y 302 1984
GC1967_MARK LOGO: NGS
GC1967_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
GC1967+STABILITY: POSITION/ELEVATION WELL
GC1967_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
GC1967+SATELLITE: SATELLITE OBSERVATIONS - April 10, 2016
GC1967
GC1967  HISTORY     - Date     Condition        Report By
GC1967  HISTORY     - 1984     MONUMENTED       NGS
GC1967  HISTORY     - 20030122 GOOD             TNDT
GC1967  HISTORY     - 20050720 GOOD             JCLS
GC1967  HISTORY     - 20110418 GOOD             JCLS
GC1967  HISTORY     - 20160410 GOOD             WOOLPT
GC1967
GC1967                           STATION DESCRIPTION
GC1967
GC1967'DESCRIBED BY NATIONAL GEODETIC SURVEY 1984
GC1967'2.5 KM (1.55 MI) SOUTH FROM NASHVILLE.
GC1967'2.5 KM (1.55 MI) SOUTH ALONG U.S. HIGHWAY 31 (EIGHTH AVENUE) FROM THE
GC1967'JUNCTION OF BROADWAY AVENUE AT THE POST OFFICE IN NASHVILLE TO THE
GC1967'MARK, SET IN TOP OF A 0.6 METER (2.0 FT) BY 0.91 METERS (3.0 FT) ROCK
GC1967'OUTCROP IN RESERVOR PARK, 0.1 KM (0.05 MI) NORTH OF THE JUNCTION OF
GC1967'ARGYLE AVENUE AND U.S. HIGHWAY 31, 33.59 METERS (110.2 FT) WEST OF THE
GC1967'CENTERLINE OF THE U.S. HIGHWAY 31 SOUTHBOUND LANE, 27.61 METERS
GC1967'(90.6 FT) WEST OF A METAL LIGHT POLE, 16.46 METERS (54.0 FT) NORTH OF
GC1967'THE NORTH EDGE OF A EAST-WEST SIDEWALK LEADING TO THE MAIN BUILDING IN
GC1967'THE PARK, 28.41 METERS (93.2 FT) NORTHWEST OF THE CENTER OF THE TOP OF
GC1967'THE SOUTH ROCK PILLAR BY THE STEPS LEADING TO THE STEPS AND SIDEWALK
GC1967'ON THE WEST SIDE OF THE HIGHWAY, AND 32.46 METERS (106.5 FT) NORTHEAST
GC1967'OF A LIGHT POLE NUMBER 9652-222 BY THE SIDEWALK IN THE PARK.
GC1967'THE MARK IS 2.44 M ABOVE HIGHWAY.
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GC1967
GC1967                          STATION RECOVERY (2003)
GC1967
GC1967'RECOVERY NOTE BY TN DEPT OF TRANSP 2003 (DWB)
GC1967'RECOVERED IN GOOD CONDITION.
GC1967
GC1967                          STATION RECOVERY (2005)
GC1967
GC1967'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2005
GC1967'RECOVERED IN GOOD CONDITION.
GC1967
GC1967                          STATION RECOVERY (2011)
GC1967
GC1967'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2011
GC1967'RECOVERED IN GOOD CONDITION.
GC1967
GC1967                          STATION RECOVERY (2016)
GC1967
GC1967'RECOVERY NOTE BY WOOLPERT CONSULTANTS 2016 (BSM)
GC1967'RECOVERED AS DESCRIBED.  MARK IS ALSO 62.1 FT (18.9 M) NORTHWEST OF
GC1967'THE NORTHWEST CORNER OF A 5 FT (1.5 M) SQUARE CONCRETE FOUNDATION.
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5. Station Photos

Geodetic/Ground control images are contained in a separate zip file and are labeled/ordered as the control points are ordered in Section 2.