



Natural Resources Conservation Service

AutoCAD Civil 3D 2020

Moving Points from Surveyed Data

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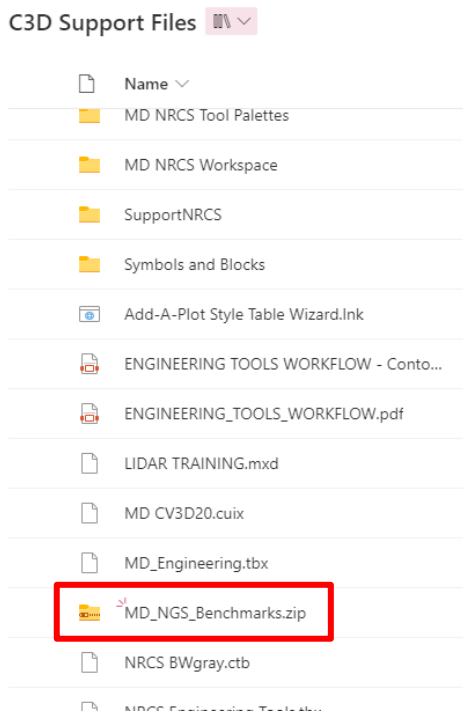
Topics Covered:

- GPS Benchmarks in Civil 3D
- Moving points from general location to geo-spatial location
- Aligning the points to the photo that is pre-loaded in Civil 3D
- Exporting the points to the new location

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GPS Benchmarks

You can download the GPS Benchmarks from the following location and add it to Civil 3D:



NRCS Sharepoint site:

C3D Support

Files>**MD_NGS_Benchmarks.zip**

Download the zipped file onto your c:drive and unzip the file

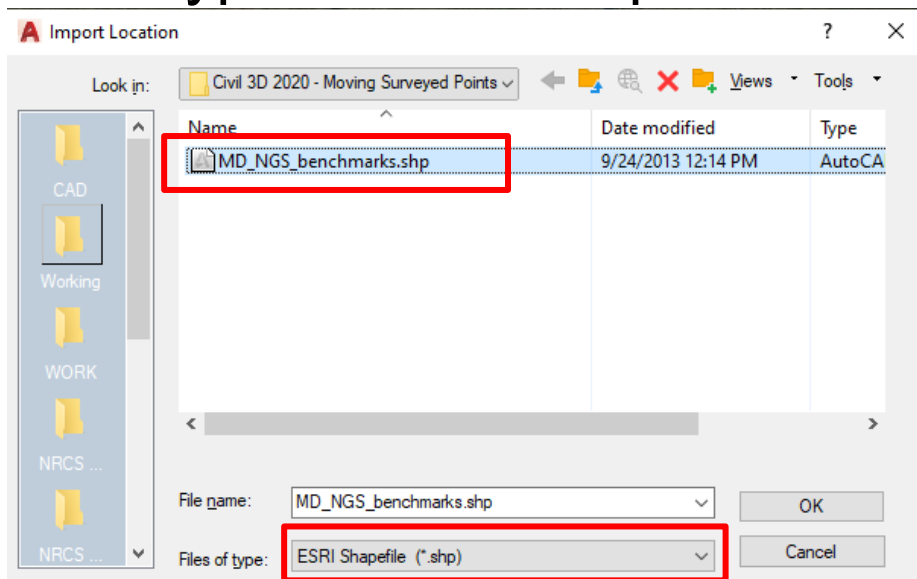
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GPS Benchmarks

Open up your drawing in Civil 3D

Type in the command line: **mapimport**

Navigate to the location where you unzipped the file to and make sure the file type is set to **.shp**> Click **OK**



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GPS Benchmarks

An Import window will appear:

Select Data>Another window will appear>Click “**Create Object Data**”>Select Create object data>OK>OK

The first screenshot shows the 'Import' dialog box for the file 'C:\Users\...\MD_NGS_benchmarks.shp'. The 'Current drawing coordinate system' is MD83F (NAD83 Maryland State Plane Zone, US Foot). The 'Import properties for each layer imported' table is as follows:

Input Layer	Drawing Layer	Object Class	Input Coordinate System	Data	Points
<input checked="" type="checkbox"/> MD_NGS_benchmark	MD_NGS_benchmark	<None>	MD83	<None>	<ACA>

The 'Data' column cell '<None>' is highlighted with a red box. A red arrow points from this box to the 'Attribute Data' dialog box in the second screenshot. In the 'Attribute Data' dialog, the 'Create object data' radio button is selected and highlighted with a red box. Below it, the 'Object Data table to use:' dropdown is set to 'MD_NGS_benchmarks'. The 'OK' button is also highlighted with a red box. A red arrow points from the 'OK' button to the third dialog box, which is partially obscured by the 'Attribute Data' dialog. In this third dialog, the 'OK' button is highlighted with a red box.

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GPS Benchmarks

Now you should see a bunch of points that are located on the **MD_NGS_benchmarks** layer (shown in white)



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GPS Benchmarks

If you select anyone of those points, you can view the properties and see the elevation and there is also a link to the website that you can copy and place in your browser to see actual photos of the benchmark

OD:MD_NGS_benchmarks	
FeatId	9778
id	9778
featureid	56
data_date	20121129
data_srce	http://www.ngs.noaa.gov/cgi-bi...
dec_long	-75.83417
dec_lat	39.64444
pid	JU4256
name	8 198
state	MD
county	CECIL
quad	NEWARK WEST (1992)
latitude	39 38 40. (N)
longitude	075 50 03. (W)
pos_datum	NAD 83
datum_tag	(1986)
pos_srce	SCALED
elevation	38.874
elev_datum	NAVD 88
elev_srce	ADJUSTED
ellip_ht	



data_date	20121129
data_srce	http://www.ngs.noaa.gov/cgi-bi...



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GPS Benchmarks

This is an example of what the webpage would look like for that specific point selected

The NGS Data Sheet

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

```

PROGRAM = datasheet95, VERSION = 8.12.5.14
Starting Datasheet Retrieval...
1 National Geodetic Survey, Retrieval Date = JULY 25, 2022
JU4256 *****
JU4256 DESIGNATION - B 198
JU4256 PID - JU4256
JU4256 STATE/COUNTRY- MD/CECIL
JU4256 COUNTRY - US
JU4256 USGS QUAD - NEWARK WEST (2016)
JU4256
JU4256 *CURRENT SURVEY CONTROL
JU4256
JU4256 NAD 83(1986) POSITION- 39 38 40.63 (N) 075 50 02.06 (W) HD_HELDP1
JU4256 NAVD 88 ORTHO HEIGHT - 38.874 (meters) 127.54 (feet) ADJUSTED
JU4256
JU4256 GEOID HEIGHT - -33.088 (meters) GEOID18
JU4256 DYNAMIC HEIGHT - 38.855 (meters) 127.48 (feet) COMP
JU4256 MODELED GRAVITY - 980,142.9 (mgal) NAVD 88
JU4256
JU4256 VERT ORDER - SECOND CLASS I
JU4256
JU4256.The horizontal coordinates were determined by differentially corrected
JU4256.hand held GPS observations or other comparable positioning techniques
JU4256.and have an estimated accuracy of +/- 3 meters.
JU4256.
JU4256.The orthometric height was determined by differential leveling and
JU4256.adjusted by the NATIONAL GEODETIC SURVEY
JU4256.in June 1995.
JU4256
JU4256.Significant digits in the geoid height do not necessarily reflect accuracy.
JU4256.GEOID18 height accuracy estimate available here.
JU4256
JU4256.Click photographs - Photos may exist for this station.
JU4256
JU4256.The dynamic height is computed by dividing the NAVD 88
JU4256.geopotential number by the normal gravity value computed on the
JU4256.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
JU4256.degrees latitude (g = 980.6199 gals.).
JU4256
JU4256.The modeled gravity was interpolated from observed gravity values.
JU4256
JU4256; North East Units Estimated Accuracy
JU4256;SPC MD - 220,211.2 500,092.9 MT (+/- 3 meters HH1 GPS)
JU4256
JU4256_U.S. NATIONAL GRID SPATIAL ADDRESS: 18SVJ2844988646(NAD 83)
JU4256
JU4256 SUPERSEDED SURVEY CONTROL
JU4256
JU4256.No superseded survey control is available for this station.
JU4256
JU4256_MARKER: DD = SURVEY DISK
JU4256_SETTING: 35 = SET IN A MAT FOUNDATION OR CONCRETE SLAB OTHER THAN
JU4256_SETTING: 35 = SET IN A MAT FOUNDATION OR CONCRETE SLAB OTHER THAN

```


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GPS Benchmarks

Select the photographs hyperlink to see a photo
(not all the points have photos)

The NGS Data Sheet

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

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Starting Datasheet Retrieval...
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JU4256 U.S. NATIONAL GRID SPATIAL ADDRESS: 18SVJ2844988646(NAD 83)
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JU4256_MARKER: DD = SURVEY DISK
JU4256_SETTING: 35 = SET IN A MAT FOUNDATION OR CONCRETE SLAB OTHER THAN
JU4256_SETTING: SURVEY
```



B 198, JU4256, 2, 20130204

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Surveyed data points adjustment

If you surveyed a site using 5000 (Northing) and 10000 (Easting) you will not be able to have the map behind your survey because the survey was not completed using a specific datum. This will explain the process on how to adjust your surveyed point data to match with the map shown in Civil 3D.

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Surveyed data points adjustment

The first step is to make sure that you create a copy of your original survey

```

Local_Survey_Points_org.txt - Notepad
File Edit Format View Help
2,5000.0000,10000.0000,345.6240,IP
3,4923.0870,9905.7300,343.7550,IP-HB2
4,4926.5580,9917.5150,343.7890,IP-HB4
100,5021.0360,10015.7300,346.2600,ER
101,5064.9860,10003.8240,348.7580,ER
102,5056.6180,9984.0840,348.5790,ER
103,5033.6170,9957.0180,348.1920,ER
104,5005.4850,9926.0120,348.1260,ER
105,5084.6390,9881.0150,351.2320,BLDC
106,5071.0440,9849.0680,348.7160,BLDC
107,5043.1660,9849.5050,351.2330,BLDC
108,5032.9110,9846.4610,352.0220,GS
109,5011.6360,9859.5880,349.1800,GS
110,4993.8250,9853.1690,346.6740,ER
111,4974.1720,9846.6620,345.6980,ER
112,4950.4210,9852.8520,345.1500,ER
113,4929.6030,9805.1570,342.6930,ER
114,4959.1020,9798.4800,342.4510,ER
115,4965.5440,9760.4130,340.0180,ER
116,4966.2110,9736.3650,339.6220,CONC
117,4935.0750,9702.6970,337.2690,CONC
118,4925.4170,9701.7460,337.2050,CONC
  
```

You can just add `_org` at the end of the file name

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Surveyed data points adjustment

The next step is to locate a point that you can move from your surveyed points to a location shown on the map in Civil 3D. This can be a building corner, edge of road, or anything that you can see on the aerial map and have a surveyed point of. It is recommended that if you are going to adjust your survey points, make sure that you survey multiple building corners or any other structures that may show on the aerial map.

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Surveyed data points adjustment



On this survey multiple building corners, corner of concrete and edge of road were shot as a reference

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Surveyed data points adjustment

Once you determine a shot that you can “match” to the aerial, draw a polyline from the surveyed point (make sure End Point Object Snap is on, this ensures that the polyline you draw will use the same elevation as the surveyed point elevation) to the aerial map point.

Another option is to type in the command line: **osnapz** and change it to <1>. This will not allow the object to change elevation when being moved.

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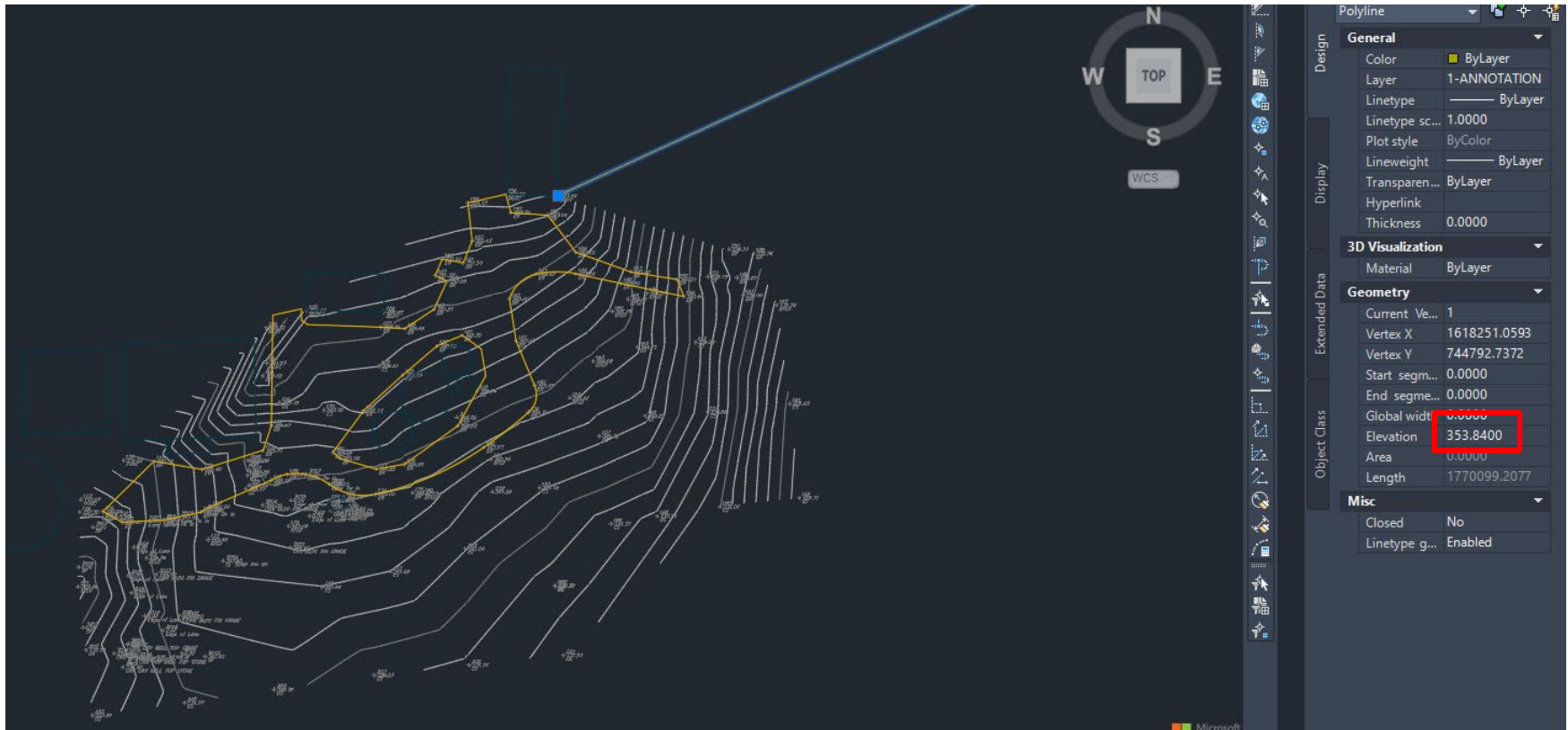
Surveyed data points adjustment



This is the corner of the building that will be used in adjusting the original survey points to

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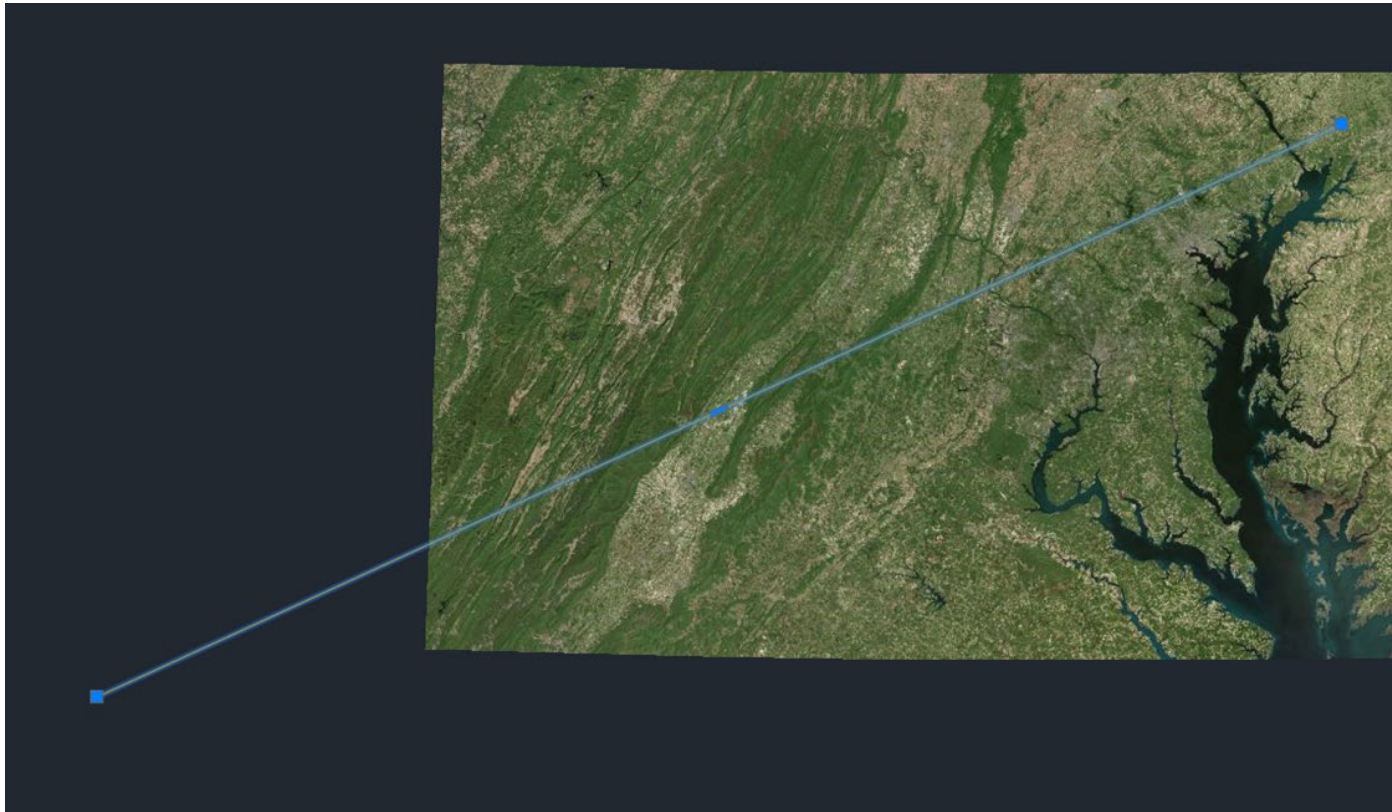
Surveyed data points adjustment



As shown in the properties, the polyline has an elevation of 353.84

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Surveyed data points adjustment



The polyline must be drawn to a location on the aerial map in Civil 3D

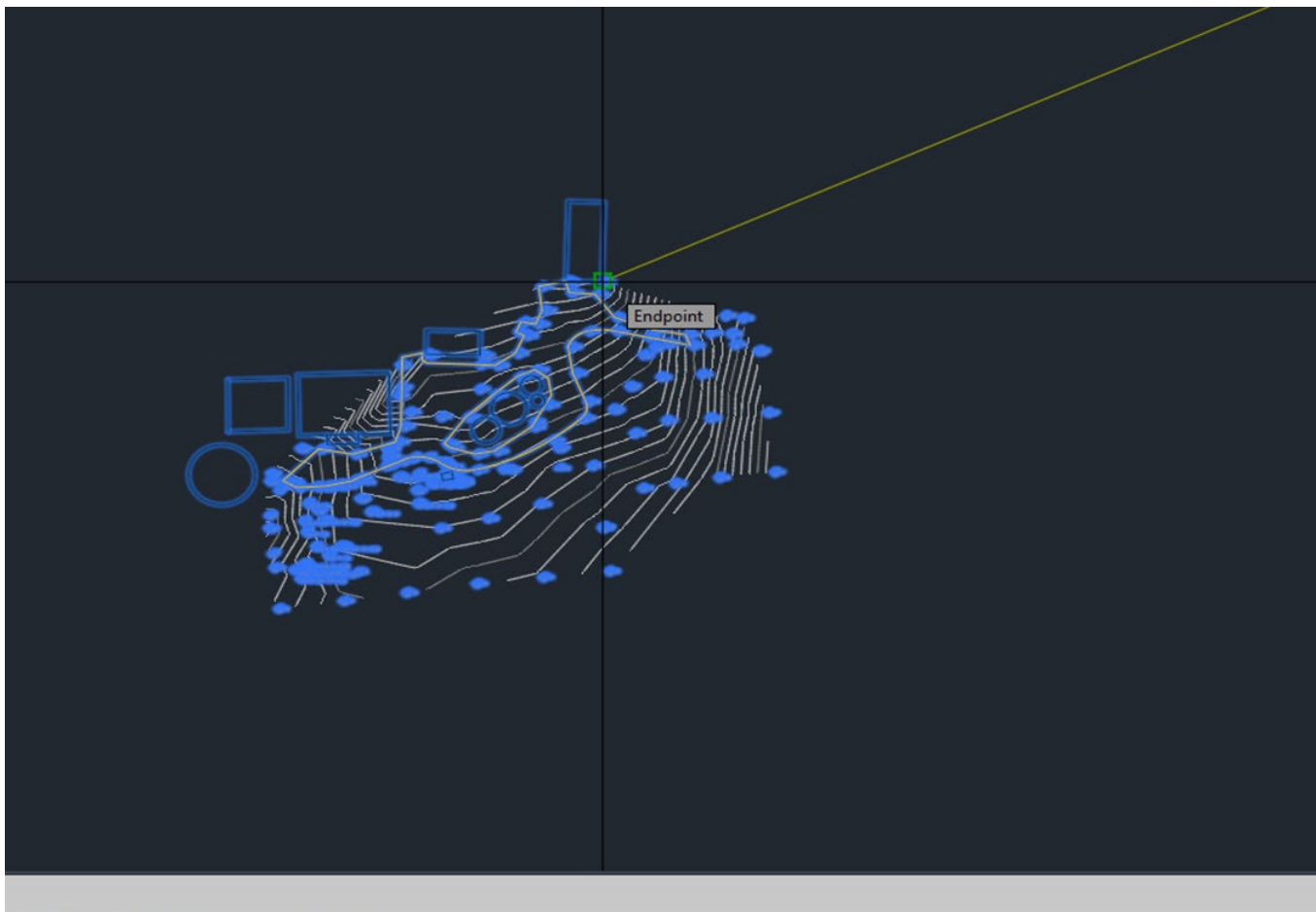
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Surveyed data points adjustment

Once you created the polyline, you can now select all your points and any other linework that you may have completed and type in the command line <move>, select the endpoint of the polyline, move the mouse along the entire length of the polyline until you reach the end of the polyline that is on the aerial map.

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Surveyed data points adjustment



[displacement] <Displacement>: _endp of

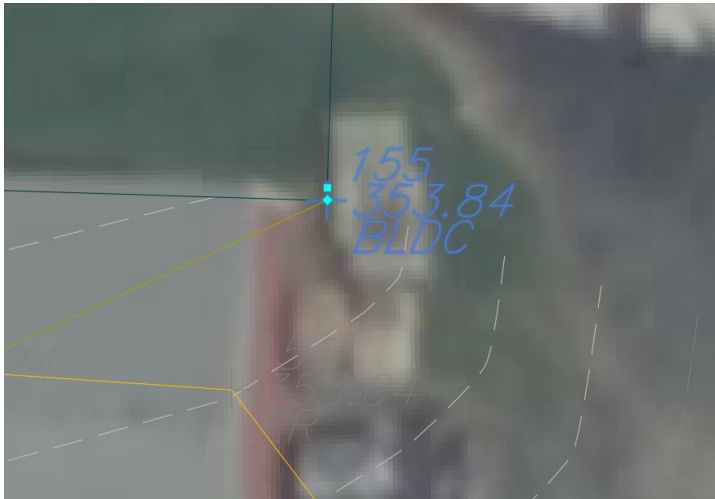
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Surveyed data points adjustment



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Surveyed data points adjustment



Verify that the point elevation remained the same as the original point elevation (In this example, 353.84 was the original elevation)

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Surveyed data points adjustment

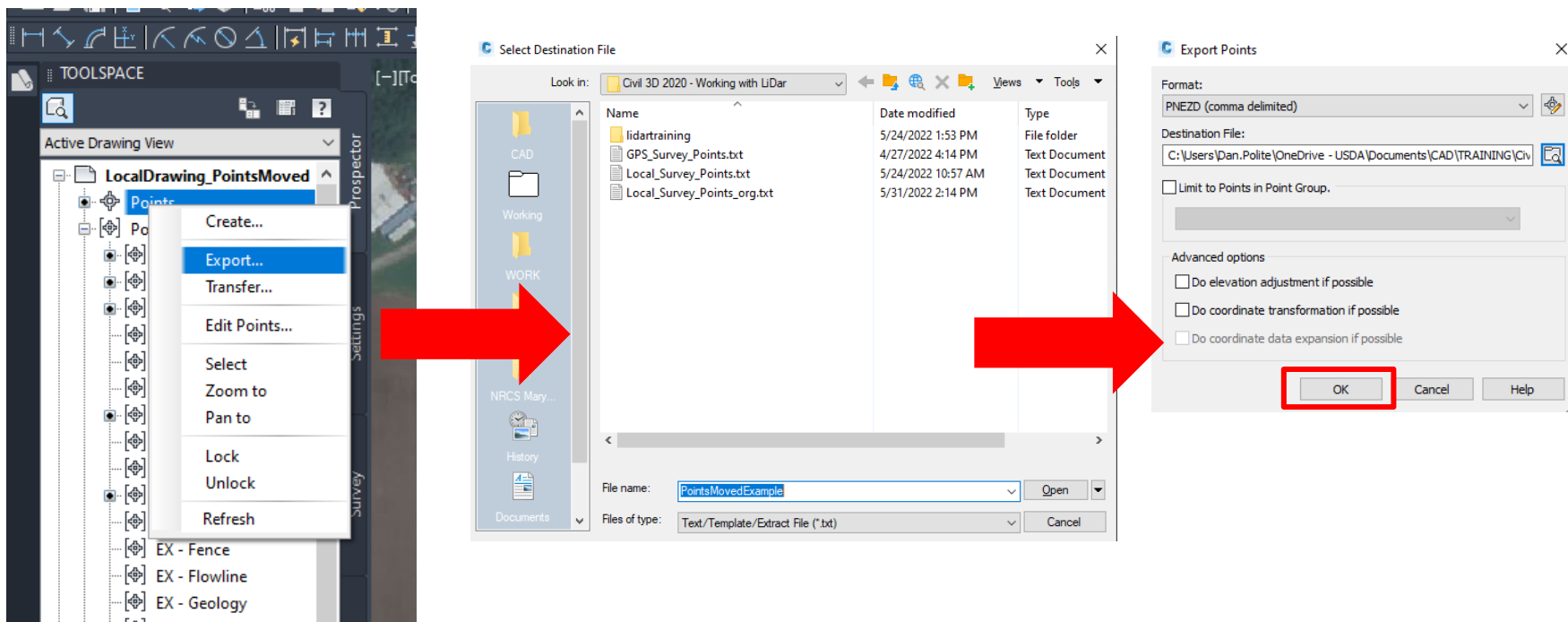
Now the points have been adjusted to the aerial map. If the original survey was not completed with North facing up, you will need to rotate the points to align with North. In this example, the building was used to rotate the points.

PLEASE KEEP IN MIND THAT THIS METHOD IS ONLY TO ASSIST YOU IN HAVING THE AERIAL MAP IN THE BACKGROUND

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Surveyed data points adjustment

Since the points have been moved, you **MUST UPDATE** the points to the new location and then **EXPORT** them as a new point file.





Natural Resources Conservation Service Surveyed data points adjustment

Original Point file

Local_Survey_Points_orgHeader.txt - Notepad

Point Number	Northing	Easting	Elevation	Full Description
2	5000.0000	10000.0000	345.624	IP
3	4923.0870	9905.7300	343.755	IP-HB2
4	4926.5580	9917.5150	343.789	IP-HB4
100	5021.0360	10015.7300	346.260	ER
101	5064.9860	10003.8240	348.758	ER
102	5056.6180	9984.0840	348.579	ER
103	5033.6170	9957.0180	348.192	ER
104	5005.4850	9926.0120	348.126	ER
105	5084.6390	9881.0150	351.232	BLDC
106	5071.0440	9849.0680	348.716	BLDC
107	5043.1660	9849.5050	351.233	BLDC
108	5032.9110	9846.4610	352.022	GS
109	5011.6360	9859.5880	349.180	GS
110	4993.8250	9853.1690	346.674	ER
111	4974.1720	9846.6620	345.698	ER
112	4950.4210	9852.8520	345.150	ER
113	4929.6030	9805.1570	342.693	ER
114	4959.1020	9798.4800	342.451	ER
115	4965.5440	9760.4130	340.018	ER
116	4966.2110	9736.3650	339.622	CONC
117	4935.0750	9702.6970	337.269	CONC
118	4925.4170	9701.7460	337.305	CONC
119	4925.8060	9720.0780	337.276	ER
120	4917.3260	9735.5220	337.413	ER
121	4919.0780	9768.6160	340.242	ER
122	4925.2860	9797.4430	342.228	ER
123	4943.5520	9833.0350	344.572	GS
124	4954.4710	9834.2750	344.934	GS
125	4965.9710	9834.5650	345.214	GS
126	4965.9880	9836.2850	345.055	GS
127	4957.2380	9836.4170	344.844	GS
128	4946.5310	9835.5760	344.637	GS
129	4955.2490	9865.7210	345.226	ER
130	4947.3130	9898.9830	344.634	ER
131	4967.6640	9907.5100	345.577	ER
132	4972.5600	9901.8670	345.751	ER

Adjusted Point file

PointsMovedExampleHeader.txt - Notepad

Point Number	Northing	Easting	Elevation	Full Description
2	744711.7154	1618425.2010	345.624	IP
3	744616.6400	1618501.1162	343.755	IP-HB2
4	744628.4609	1618497.7696	343.789	IP-HB4
100	744727.6662	1618404.3320	346.260	ER
101	744716.2241	1618360.2590	348.758	ER
102	744696.3970	1618368.4184	348.579	ER
103	744669.0901	1618391.1329	348.192	ER
104	744637.7893	1618418.9365	348.126	ER
105	744593.6290	1618339.3127	351.232	BLDC
106	744561.5405	1618352.5702	348.716	BLDC
107	744561.6837	1618380.4513	351.233	BLDC
108	744558.5318	1618390.6736	352.022	GS
109	744571.4338	1618412.0858	349.180	GS
110	744564.8274	1618429.8282	346.674	ER
111	744558.1137	1618449.4115	345.698	ER
112	744564.0530	1618473.2264	345.150	ER
113	744516.1412	1618493.5406	342.693	ER
114	744509.7755	1618463.9728	342.451	ER
115	744471.7785	1618457.1300	340.018	ER
116	744447.7389	1618456.2096	339.622	CONC
117	744413.7446	1618486.9890	337.269	CONC
118	744412.6919	1618496.6364	337.305	CONC
119	744431.0269	1618496.4407	337.276	ER
120	744446.3807	1618505.0830	337.413	ER
121	744479.4913	1618503.6799	340.242	ER
122	744508.3822	1618497.7760	342.228	ER
123	744544.1647	1618479.8862	344.572	GS
124	744545.5197	1618468.9808	344.934	GS
125	744545.9309	1618457.4845	345.214	GS
126	744547.6510	1618457.4857	345.055	GS
127	744547.6908	1618466.2366	344.844	GS
128	744546.7370	1618476.9341	344.637	GS
129	744576.9722	1618468.5343	345.226	ER
130	744610.1487	1618476.8204	344.634	ER
131	744618.8897	1618456.5604	345.577	ER
132	744613.2986	1618451.6052	345.751	ER

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Surveyed data points adjustment

I would recommend creating a new drawing and importing the points that you just exported to verify that they are in the correct location

MAKE SURE THAT YOU NOTE ON THE DRAWING THAT THE POINTS WERE SURVEYED LOCALLY AND ADJUSTED TO THE DATUM USED, IN THIS EXAMPLE IT WOULD BE NAD83

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Things to Know

- If you have a question – ASK!
- There are always multiple ways to do the same thing – use the one(s) that work best for you
- Keep in mind the goal of what you are using AutoCAD/Civil 3D for
- Use help sources
- This program can be as simple or as complicated as you would like it to be
- Spend time using the program and, whenever possible, with other people who use the program

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Questions?

