

TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

ENGINEERING #17

SPOKANE, WASHINGTON
March, 2010

PROCEDURE FOR DOWNLOADING SURVEY GRADE GPS RAW DATA FROM LEICA INTO LEICA GEO OFFICE AND CREATING AN ASCII FILE FOR IMPORTATION INTO CAD

SUMMARY

The following provides instructions for processing survey grade GSP raw data from a Leica data recorder, downloading the data into Leica Geo-Office and producing an ASCII file that can be imported into Civil 3D for the development of a DTM.

BACKGROUND

Successful post processing of collected survey grade GPS data requires many steps in order to have survey data that has been corrected to user defined coordinates. The following instructions provide a step by step procedure for the post processing of the data collected on the hand held Leica data collectors.

The primary steps in the process are to import the raw data from both the Base Station and the Rover CF memory card, into Leica GeoOffice. Export a Rinex file from the Base Station Raw data and send to (OPUS) Online User Positioning Service for correction. The corrected data is linked to the Rover raw data for correction then compute the geoid separations. With the corrected data and the proper projections of the data an ASCII file can be generated. The ASCII file can be easily manipulated to correct any errors in the collection of the data during the survey such as incorrect point description prior to importation into CAD.

RECOMMENDATIONS

It is a good practice to copy the Base and the Rover raw data to a location on your H: drive. A good file naming convention is important for future use of the data and it might not be you. It is recommended to use the project name and date of survey as described in step 4 of the instructions.

INSTRUCTIONS

NOTE: Screen Shots and red numbers with arrows refer to the corresponding steps in the data processing procedure



Open the executable program LIECA Geo Office Combined

1) Left click Project button. The “*Project Management*” window opens.

2) Right click Projects

3) Select New – “*New Project*” window opens

4) Enter Project name followed by the date and the file description BASE. Then click OK

e.g. Landowner Name 4_22_09 BASE

- This is where the Base Raw Data will be imported.

5) Repeat steps 2 through 5 and create another project with just the Project Name and date.

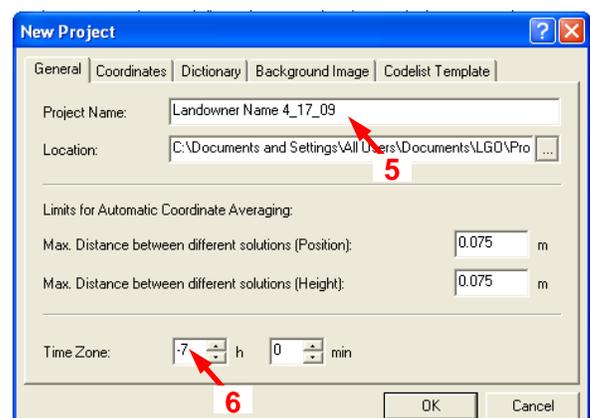
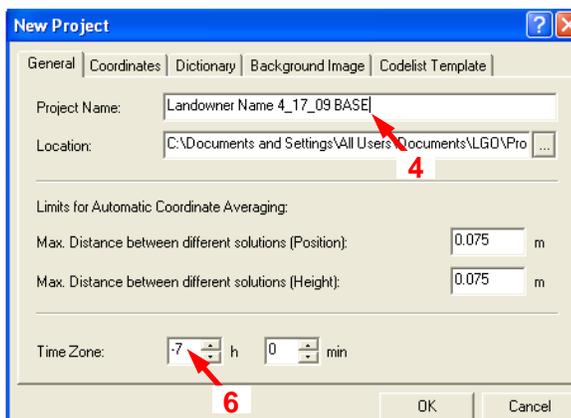
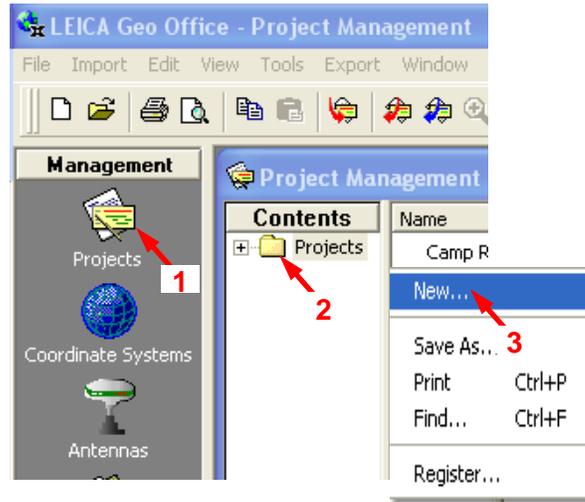
e.g. Landowner Name 4_22_09

- This is where the Rover Raw data will be Imported and you can manipulate the survey data to create the ASCII file to be imported into CAD.

6) Make sure that the Time Zone is set correctly.

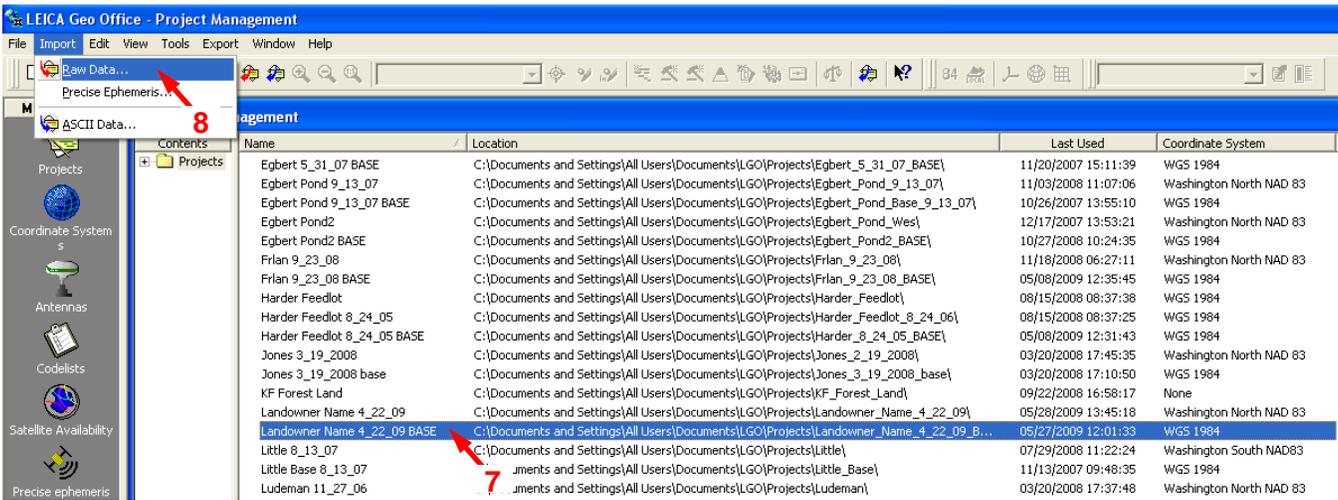
- -7 is Pacific Daylight/Summertime in relation to Greenwich Mean Time (GMT)
- -8 is PST /the rest of the year, in relation to Greenwich Mean Time

To check your time zone, select this link: [Greenwich meantime](#)



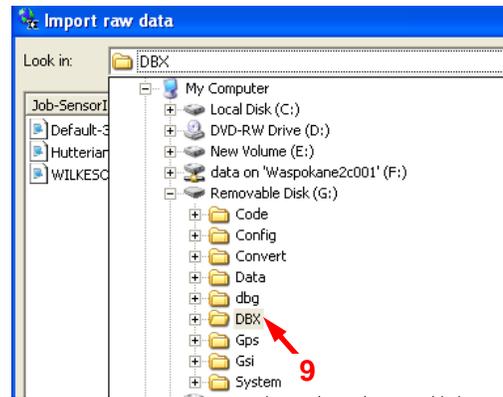
7) Select the BASE file you just created by left clicking it once, it will then become shaded.

8) From the menu list at the top of the page select *Import* and select *Raw Data*

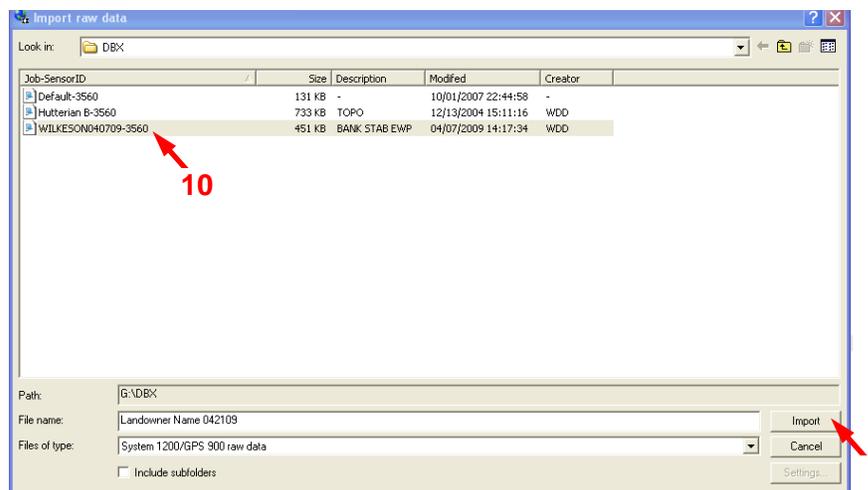


Note: At this time you should have your CF card from the Base station in your card reader and connected to your computer via USB port.

- 9) From the “Import raw data” window, browse to the Removable Disk (G:) drive in this case to the DBX folder and left click to open.



- 10) Select the raw data file of your survey project and click *Import*



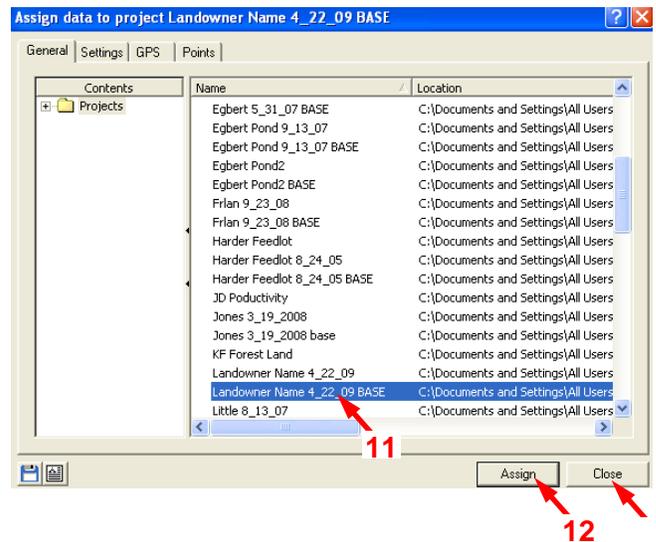
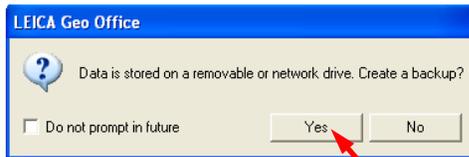
The “Assign Data to Project” window opens.

- 11) It should be on the file you created in step 4 Landowner Name 4_22_09 BASE. If not left click it once to select it and it will become shaded.

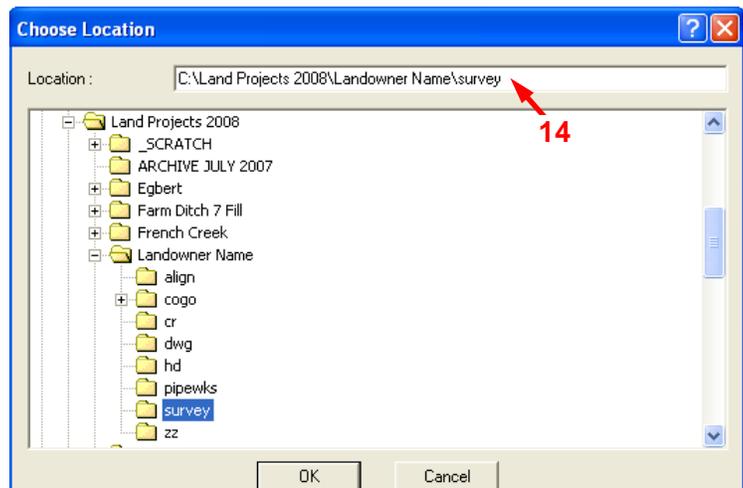
- 12) First select the *Assign* button then the *Close* button

A *LEICA Geo Office* pop up window opens asking if you would like to create a backup of the raw data.

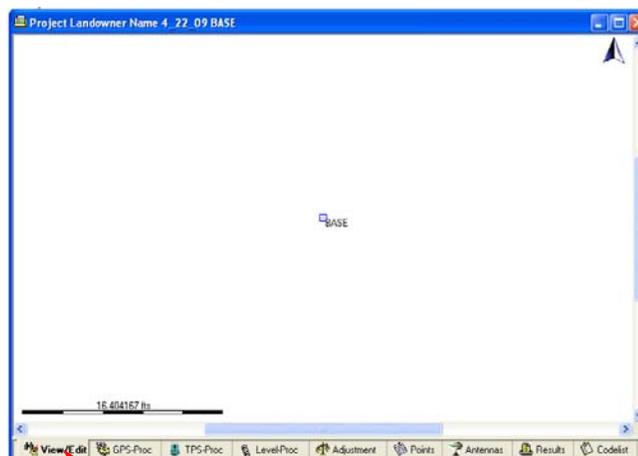
- 13) Click yes



- 14) In the “*Choose Location*” window follow the path to the Land Projects for CAD folder and save the base raw data in the survey subfolder and OK



- 15) The project will open. Select the *View/Edit* tab to see the Base Station Point.

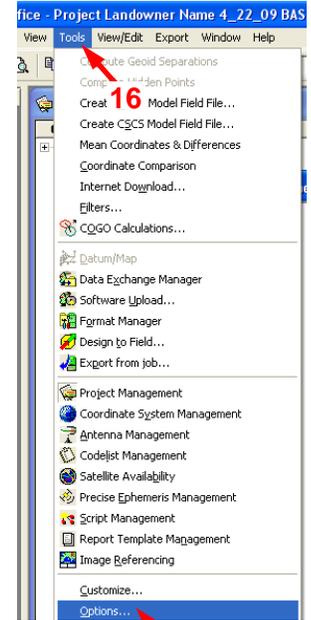
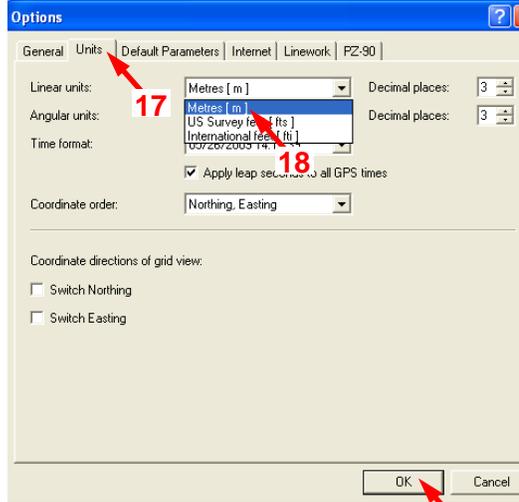


Make sure that the measurement units are in meters because that is what OPUS “*Online Positioning User Service*” uses to correct the Base Station Data.

16) Select *Tools* from menu list at the top of the page and select *Options*

17) The “*Options*” window opens. Select the *Units Tab*

18) Select *Metres [m]*
Then OK



19) At the project window Left click the *BASE* station point once and it will turn blue

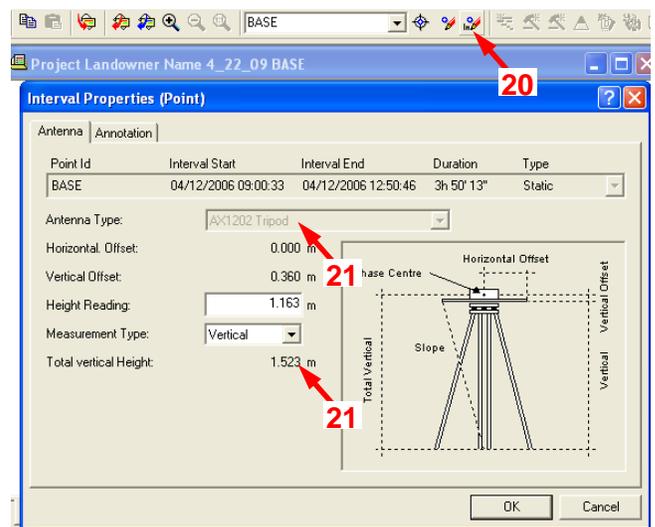


20) Click on the *edit interval at selected point button* and the Interval Properties (Point) window opens

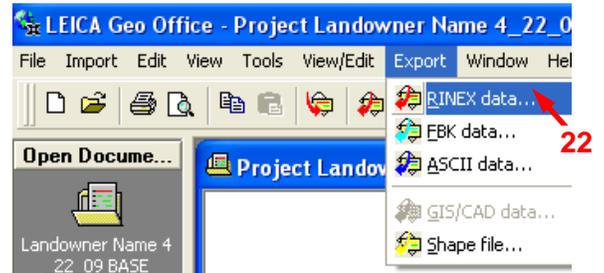


21) Make note of the *Total vertical Height* and the *Antenna Type* you will need this information later when sending data to OPUS.

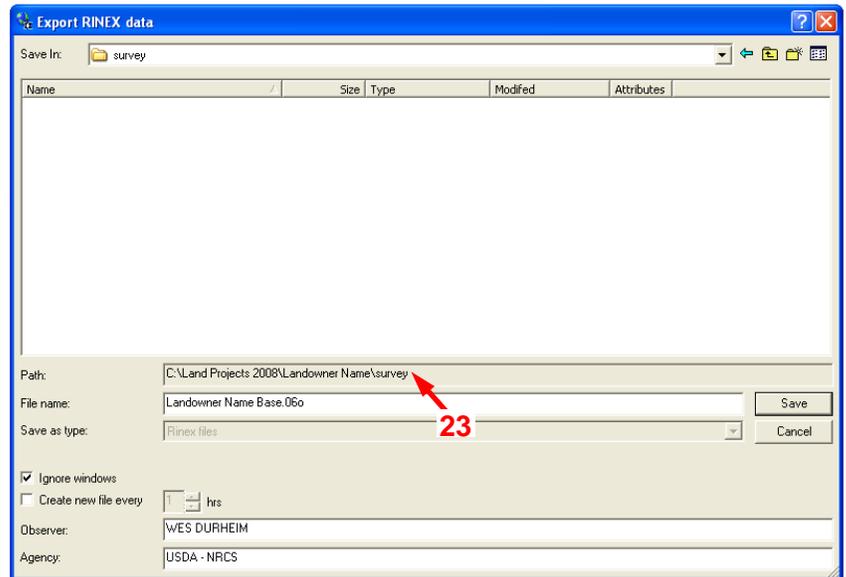
Note: Be careful NOT to read the “Height Reading”



22) Select Export from the menu list at the top of the page then select *RINEX data*



23) The “Export RINEX data” window opens. Check the path destination folder to make sure it is correct for the CAD project and save file “landowner name BASE.06o” Notice default extension.



Open OPUS using the following link: <http://www.ngs.noaa.gov/OPUS/>

- Complete items 1-4 on the OPUS website using the data in steps 21-23

Note: if your survey is less than 2 hours the RINEX File will need to be uploaded as *RAPID STATIC*. Otherwise Use the *STATIC* upload.



You will receive an email from OPUS in less than a minute typically and the following is an example of what the email will contain. The data you will need to correct for the base station in the project file is highlighted.

OPUS Correction data received to adjust the base station data.

FILE: Landowner_Name.06o 000049257

NGS OPUS SOLUTION REPORT

=====

All computed coordinate accuracies are listed as peak-to-peak values.

For additional information: www.ngs.noaa.gov/OPUS/Using_OPUS.html#accuracy

USER: wes.durheim@wa.usda.gov
RINEX FILE: Landowner_Name.06o

DATE: May 26, 2009
TIME: 22:55:00 UTC

SOFTWARE: page5 0810.20 master.pl 0810233
EPHEMERIS: igs13703.eph [precise]
NAV FILE: brdc1020.06n
ANT NAME: LEIAX1202GG NONE
ARP HEIGHT: 1.523

START: 2006/04/12 16:00:00
STOP: 2006/04/12 19:50:00
OBS USED: 10663 / 11170 : 95%
FIXED AMB: 59 / 63 : 94%
OVERALL RMS: 0.017(m)

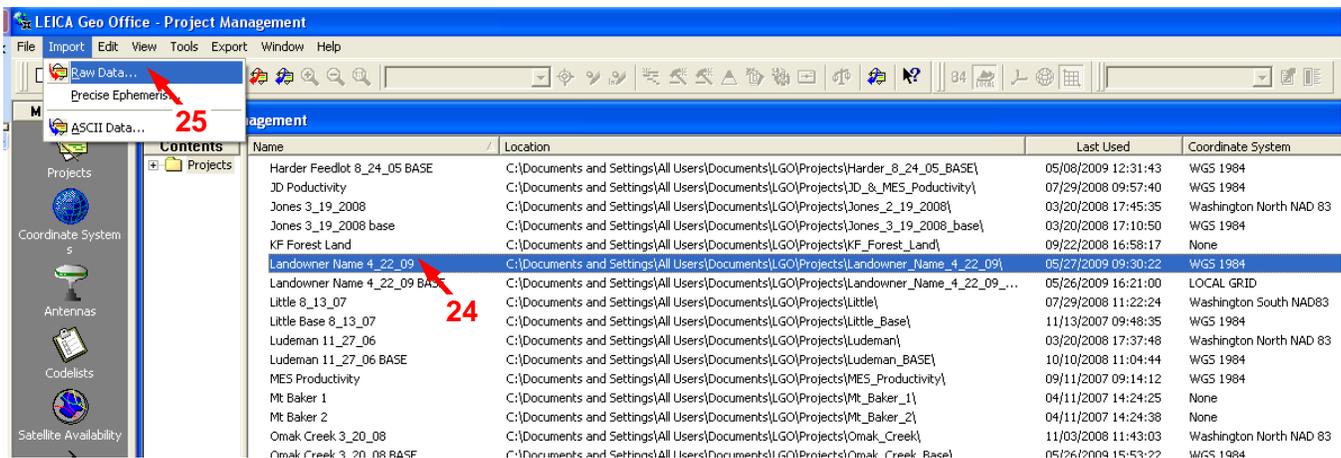
REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2006.2788)

X:	-2133441.279(m)	0.017(m)	-2133442.004(m)	0.017(m)
Y:	-3836864.539(m)	0.017(m)	-3836863.339(m)	0.017(m)
Z:	4611646.125(m)	0.012(m)	4611646.183(m)	0.012(m)
LAT:	48 3 6.44434	0.010(m)	48 3 6.44435	0.010(m)
E LON:	240 55 27.44866	0.022(m)	240 55 27.39149	0.022(m)
W LON:	117 18 23.41728	0.022(m)	117 18 23.60851	0.022(m)
EL HGT:	630.233(m)	0.013(m)	630.208(m)	0.013(m)

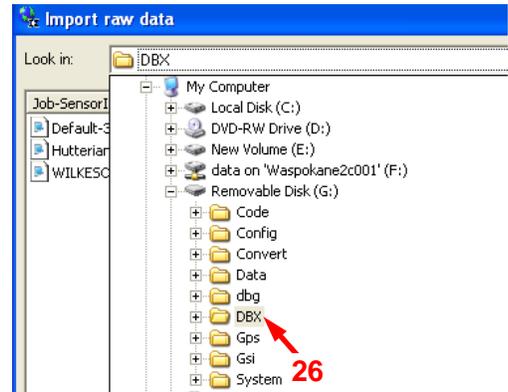
24) Select the Project file you created in step 6 by left clicking it once, it will become shaded.

25) Select *Import* and select *Raw Data* from the menu list at the top of the page

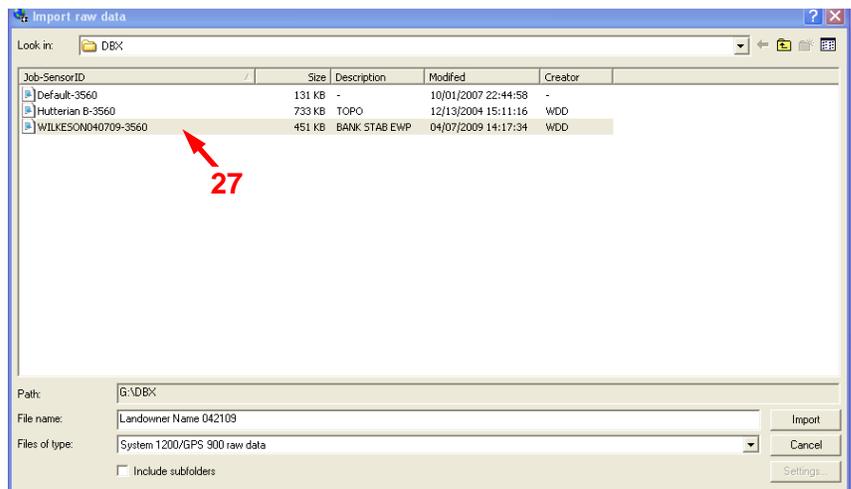


Note: At this time you should have your CF card from the Rover in your card reader and connected to your computer via USB port.

- 26) The “*Import raw data*” window opens and you need browse to Removable Disk (G:) drive, in this case to the DBX folder, and left click to open.



- 27) Select the raw data file for your project and click *Import*



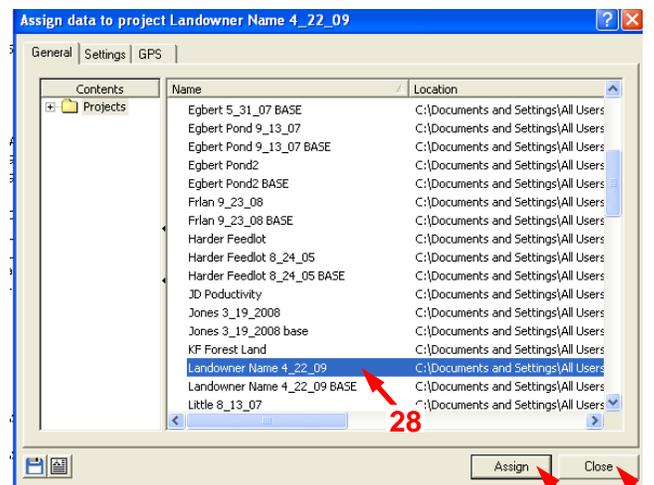
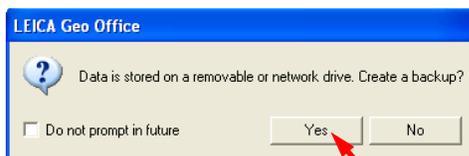
The “*Assign Data to Project*” window opens.

- 28) It should be on the file you created in step 6 Landowner Name 4_22_09. If not left click it once to select it and it will become shaded.

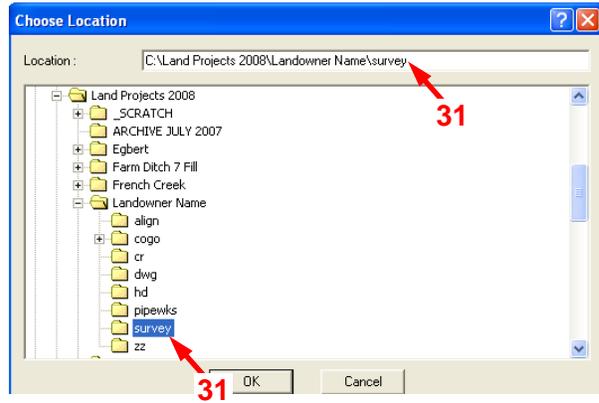
- 29) First select the *Assign* button then the *Close* button

A *LEICA Geo Office* pop up windows opens asking if you would like to create a backup of the raw data.

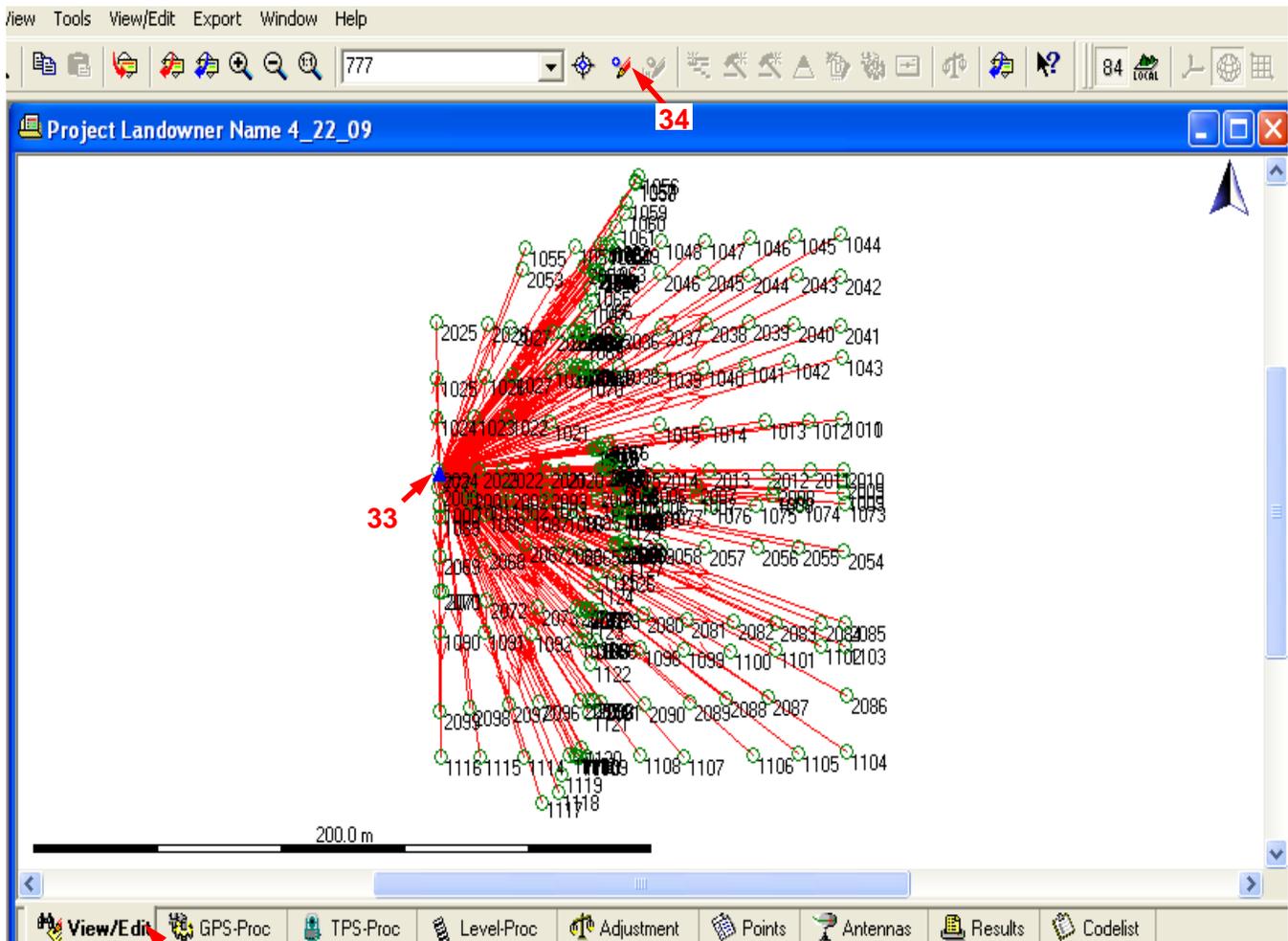
- 30) Click yes



- 31) In the “Choose Location” window follow the path to the Land Projects for CAD folder and save the Rover Raw data in the survey subfolder and select OK

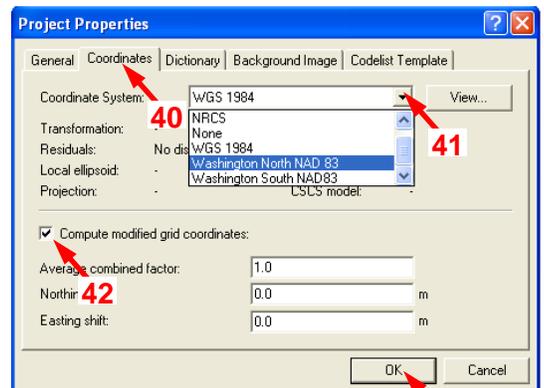
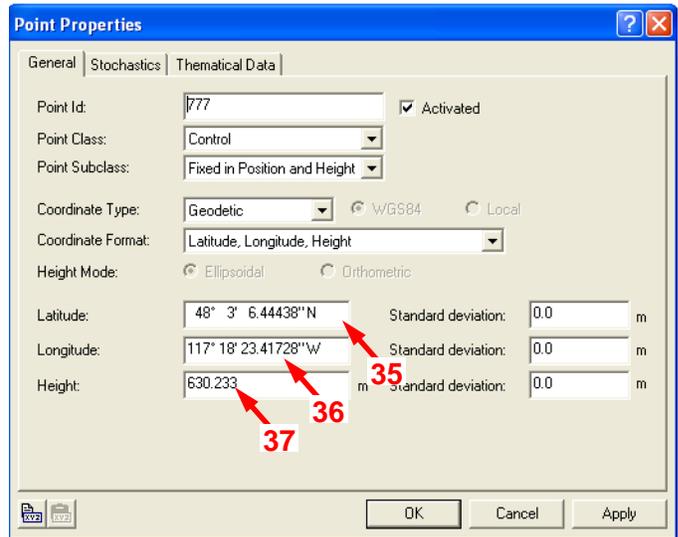
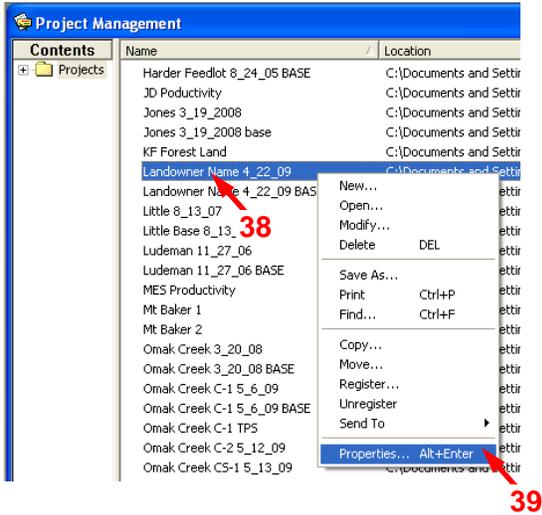


- 32) The project opens select the View/Edit tab to see the rover survey points.
- 33) Click the Base Station Point the green triangle it will turn blue when selected
- 34) Then click the *edit selected point* button

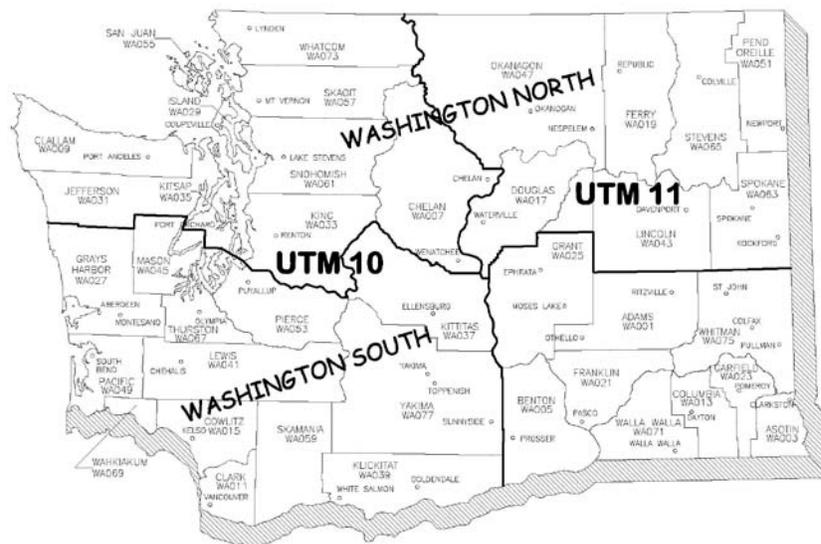


The “*Point Properties*” window opens.
Use the OPUS data to correct this point.

- 35) Latitude
- 36) Longitude
- 37) Height, then select OK
- 38) Close the Project Window and Right Click on the project
- 39) Select *Properties* at the bottom of list

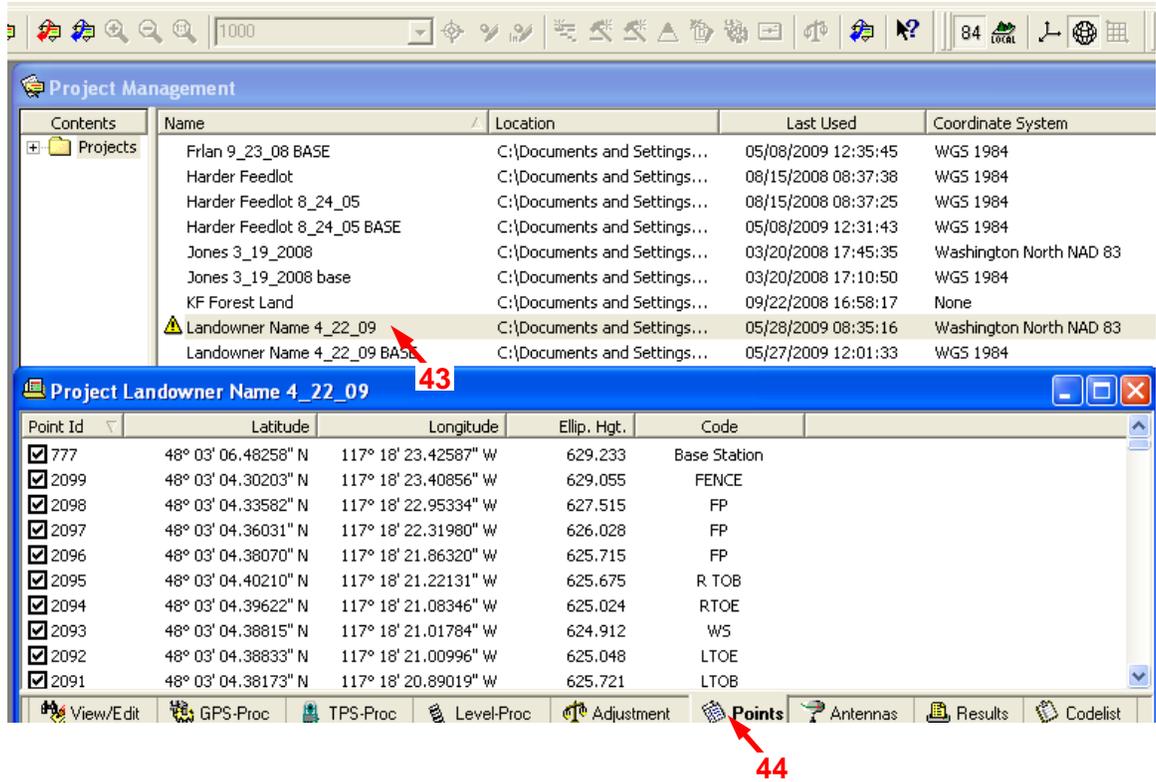


- 40) *Project Properties* window opens, select the *Coordinates* Tab
- 41) Use the drop down menu next to Coordinate System and select the proper “State Plane Coordinate System” for your survey location (See Map Below)
- 42) Check the “*Compute modified grid coordinates*” box and then select OK



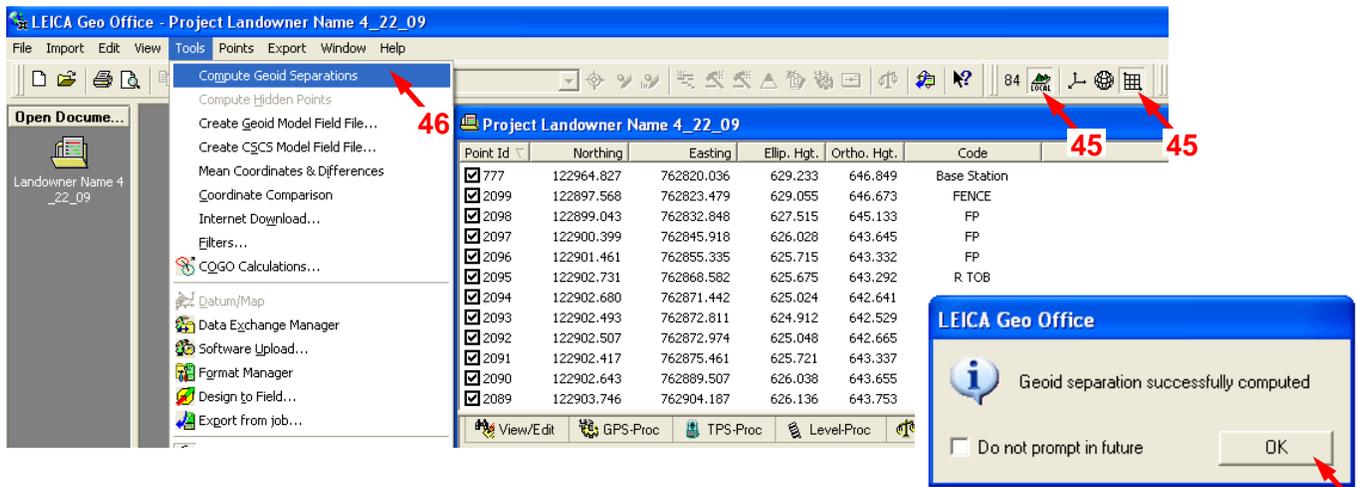
WASHINGTON STATE PLANE COORDINATE ZONES

- 43) Double click the project name in the Project Management window to open the project.
- 44) Then click the *Points* tab on the bottom of the project window to list point file data in the project



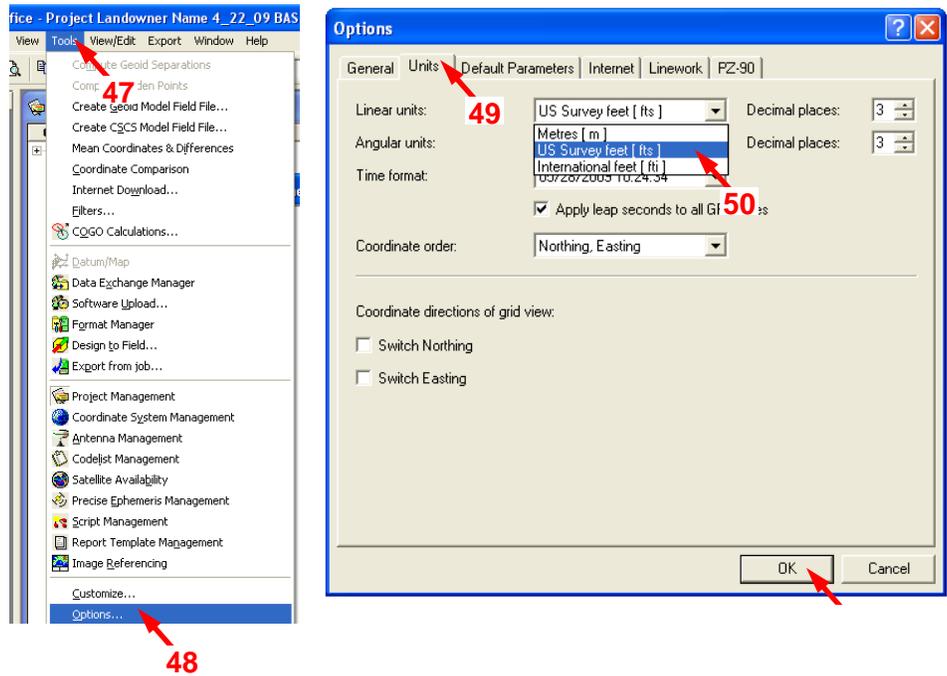
Notice that the data is in Latitude, Longitude with the elevation in meters. The data needs to be in Local Grid and Feet. In step 41 you assigned a Washington State Plane Coordinate System to this project.

- 45) Click on the *LOCAL* and *Grid* icon buttons at the top right hand side of the window and the data will change to *Northing Easting* and a new column *Ortho. Hgt.* appears but has no data.
- 46) Select the *Tools* drop down menu and click on *Compute Geoid Separations*. The *Ortho. Hgt.* column will become populated and you should get a *LEICA Geo Office* pop up window, bottom right to confirm success. Click OK



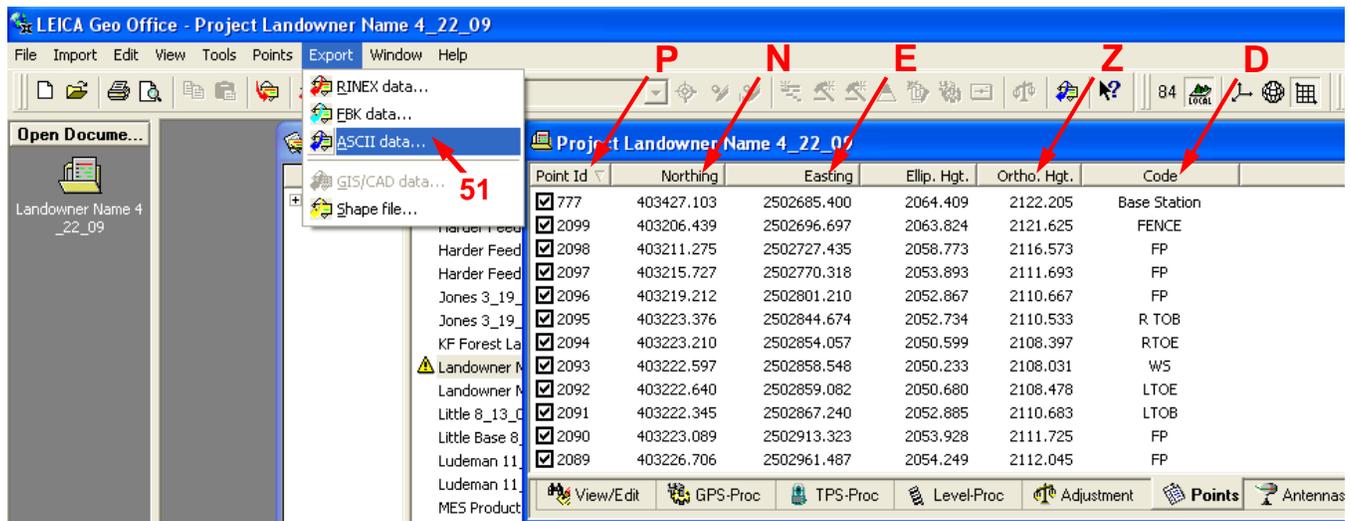
Now, we just need to get that Ortho height into feet.

- 47) Select *Tools* from the Menu list at the top of the page
- 48) Select *Options* bottom of the list
- 49) The *Options* window opens and select the *Units* Tab
- 50) Select *US Survey feet [fts]* and OK



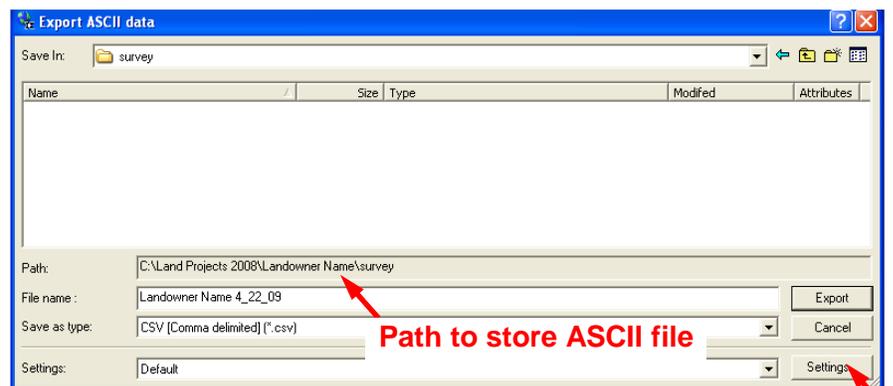
The point file data is now displayed as PNEZD in feet units and is ready to export into an ASCII file.

- 51) Select *Export* from menu list at the top of the page and click on *ASCII data*



The “*Export ASCII data*” window opens select the path to the Land Projects folder for the CAD project file where the survey raw data is stored.

- 52) Click the *Settings* button

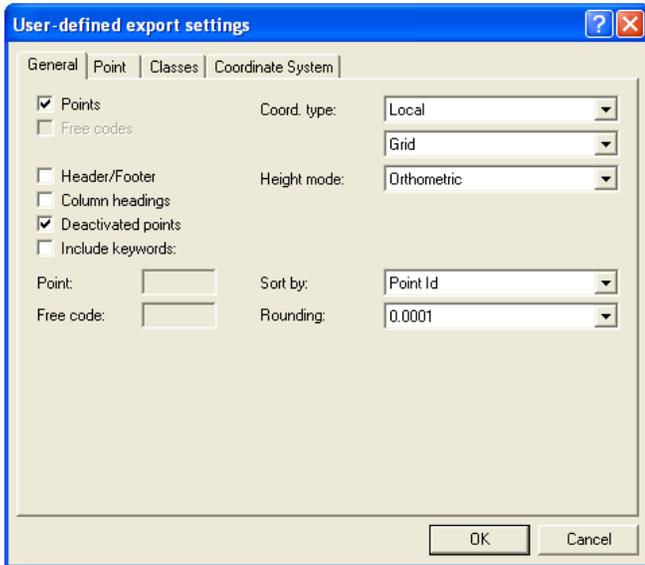


52

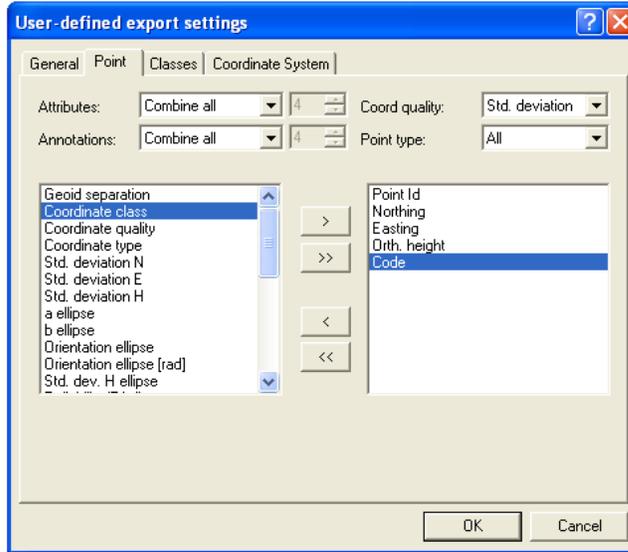
There are four tabs in the *User-defined export settings* window. Set the information under each tab to the settings on the screenshots below.

The only exception is the Washington State Plane Coordinate Zone needs to be set to your location based on the map on page 10 of 13

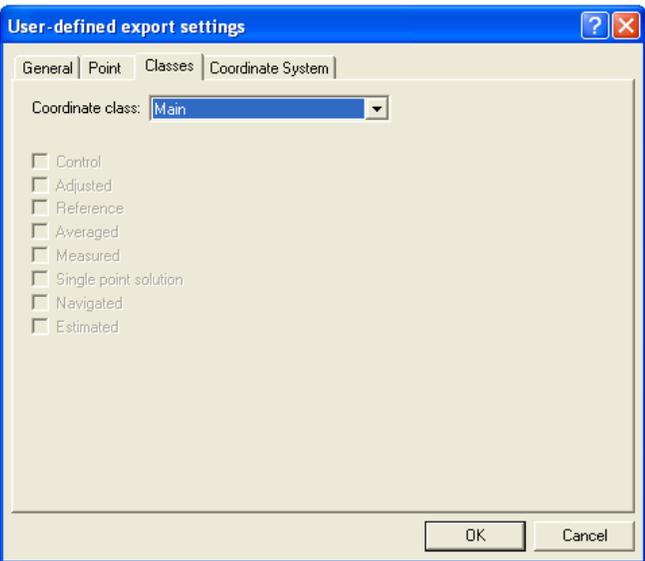
General Tab



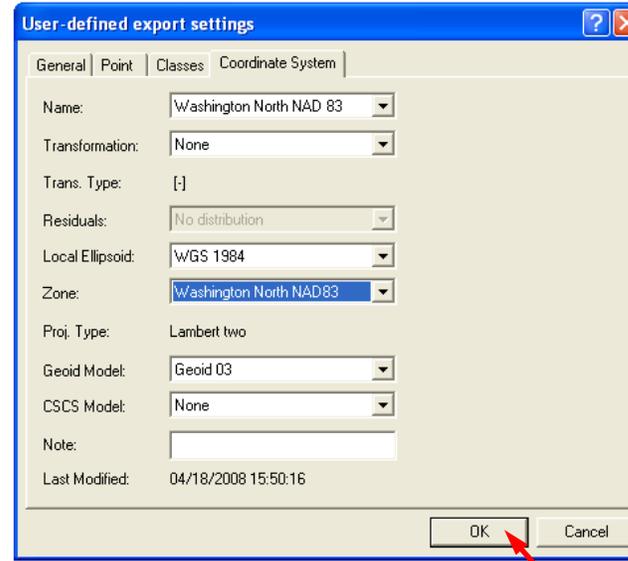
Point Tab



Classes Tab



Coordinate System Tab



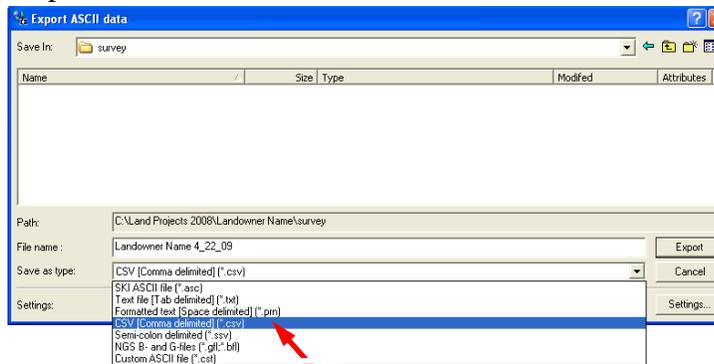
53

53) When the User-defined export settings are complete click OK

54) Click on the pull down menu next to *Save as type:* and select CSV [comma delimited] (*.csv)

55) Then click *Export*

The ASCII file in csv format is now ready to be imported into CAD.



54

55