Using Google Earth to Create Site Form Maps and Obtain Information for Site Forms

Please read these instructions in their entirety before you begin. If you have questions or problems contact Terri Bruce, the Archaeological Research Center (ARC) GIS Coordinator, at Terri.Bruce@state.sd.us or 605-394-1741.

Download and install Google Earth from www.google.com/earth; do not use Google Maps for this. After you install Google Earth, start the program. You will see a screen similar to this (Figure 1):
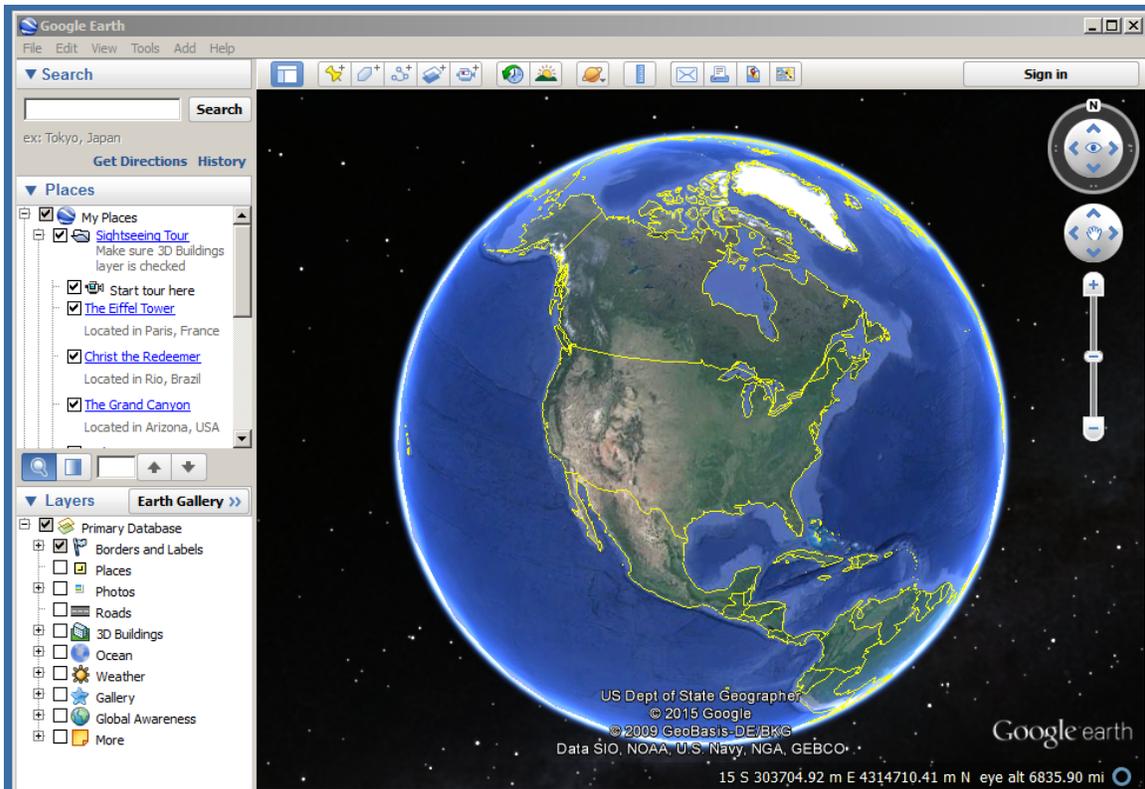
Figure 1: Google Earth introduction screen.

In the search box in the upper left portion of the window type in the town nearest the site, or the county the site is located in. You can also use latitude/longitude coordinates in the proper format (Figures 2 and 3):
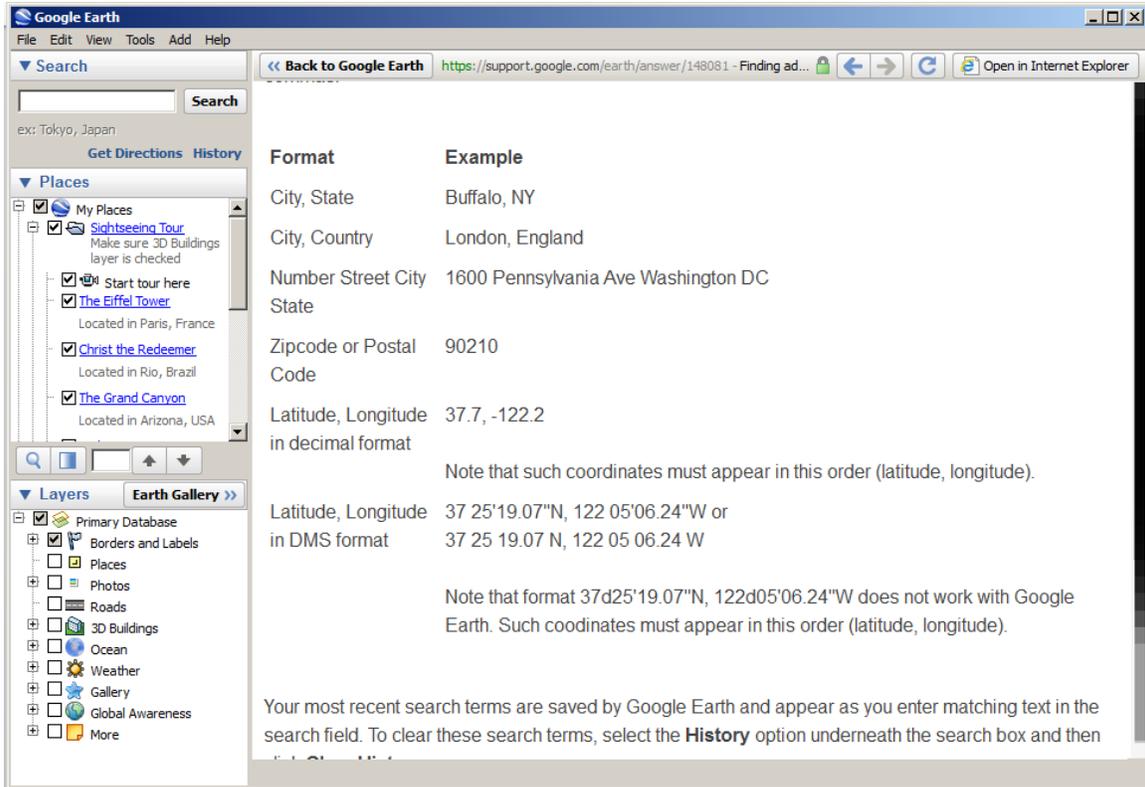
Figure 2: Google Earth Help showing the proper way to enter latitude and longitude.
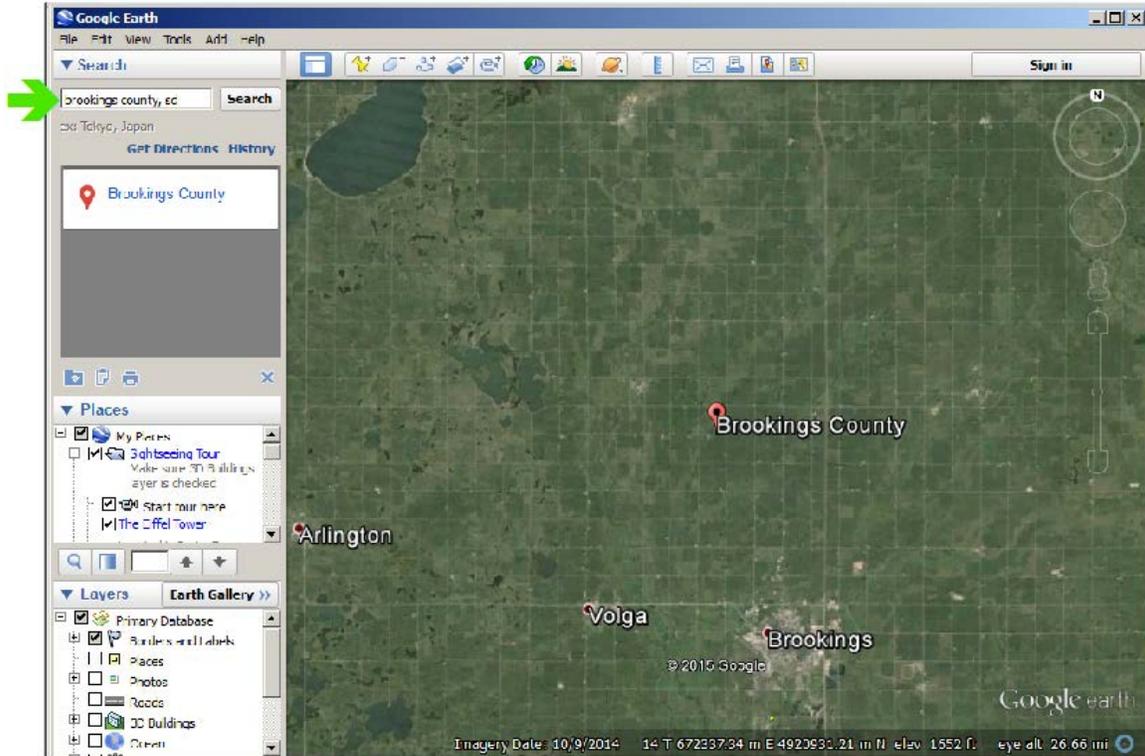
Figure 3: Zoom to the general location by typing in the county or town nearest the site.

Once you have navigated to the general location of the survey or site area you need to find the exact location of the site. If you have a UTM coordinate, maybe from a handheld GPS unit, you can do the following[1]:

- Click on the yellow stickpin (placemark) icon on the top left side of the display window (Figure 4).
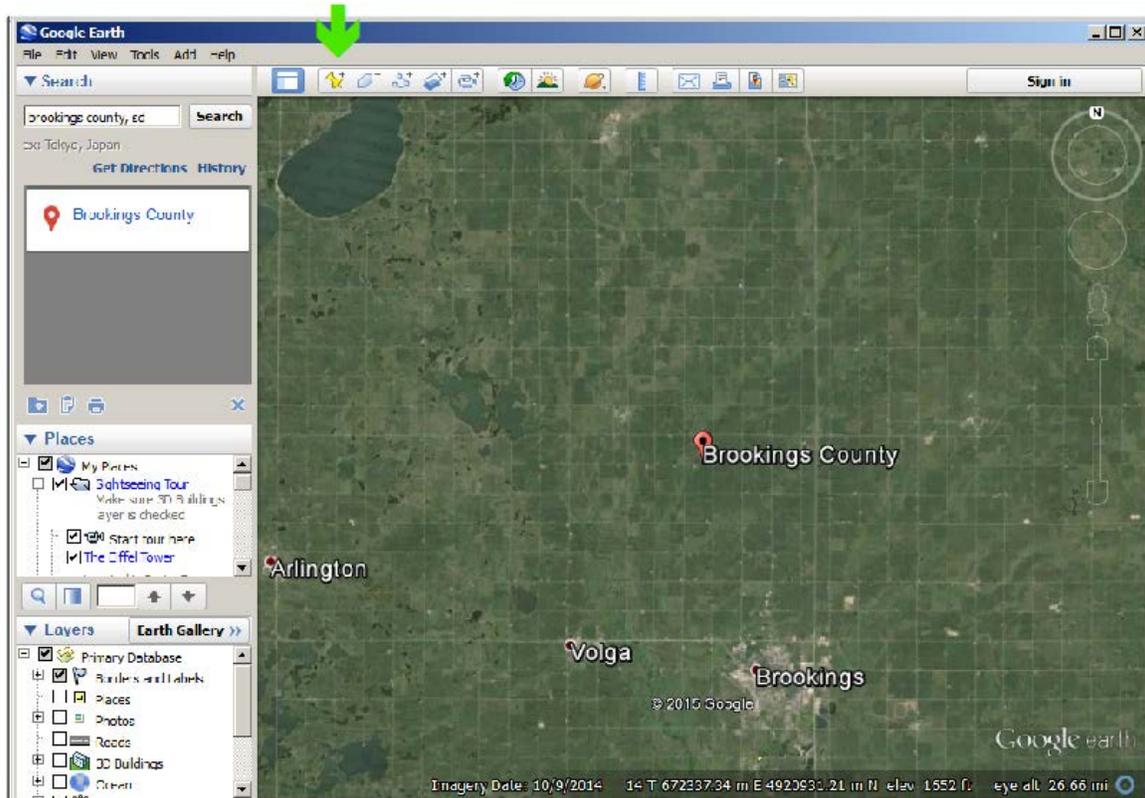
Figure 4: Click on the stickpin (placemarker) tool on the tool bar at the top of the display.

- After clicking the yellow stickpin a window will open that has several fields. It is important to be in the general location of the site so that the Zone is correct (Figure 5). South Dakota has two UTM zones – 13 and 14. The western third of the state is zone 13 and the remainder is zone 14 (Figure 6).

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[1] A note about using handheld GPS units: for any unit used to obtain UTM coordinates for anything that will be sent to us, the projection must be set to North American Datum (NAD) 83 (NAD 83). Any other projection, such as NAD 27, is obsolete and when entered into our GIS system will place the site in the incorrect location. There are utilities on the internet that can convert one coordinate to another coordinate, such as the utility found at http://tagis.dep.wv.gov/convert/. Make sure you convert to NAD 83 and the correct zone and enter that data into the site form. If you submit a site form using the NAD 27 projection, or any coordinate system other than UTM, the site form will be rejected and no site number will be issued until you provide the correct coordinates.
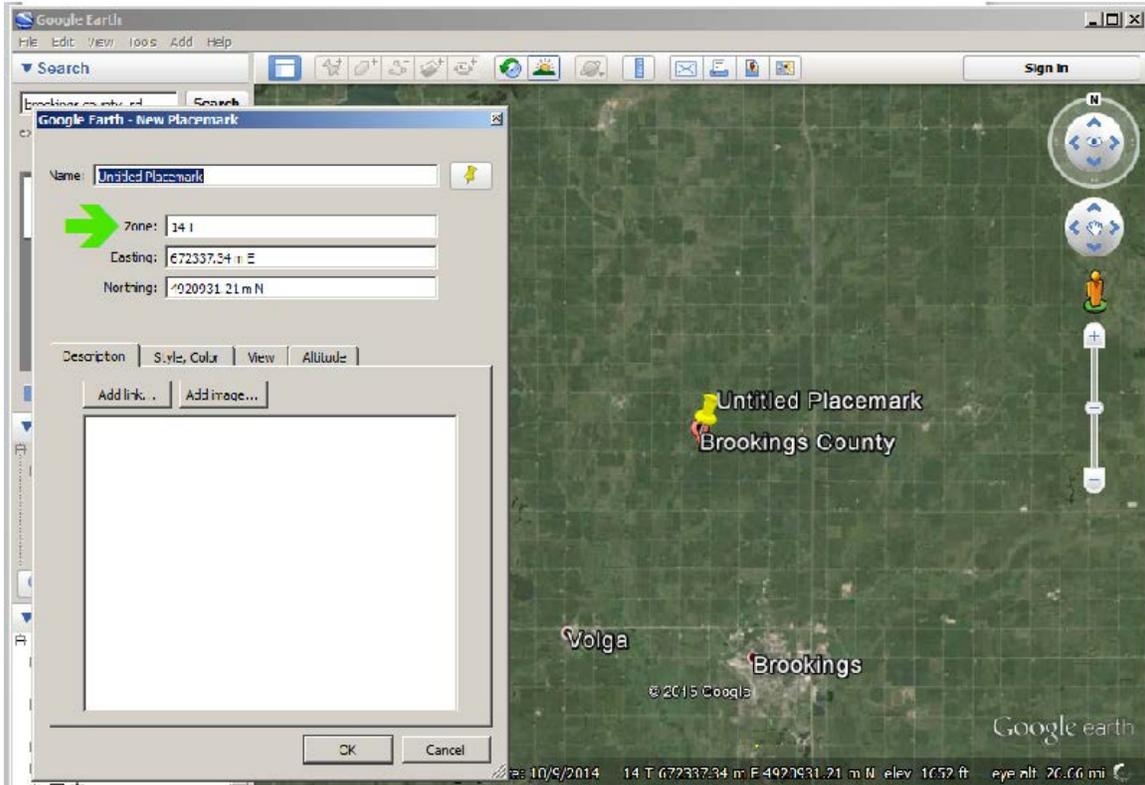
Figure 5: Placemarker window with fields for the zone and UTM easting and northing.
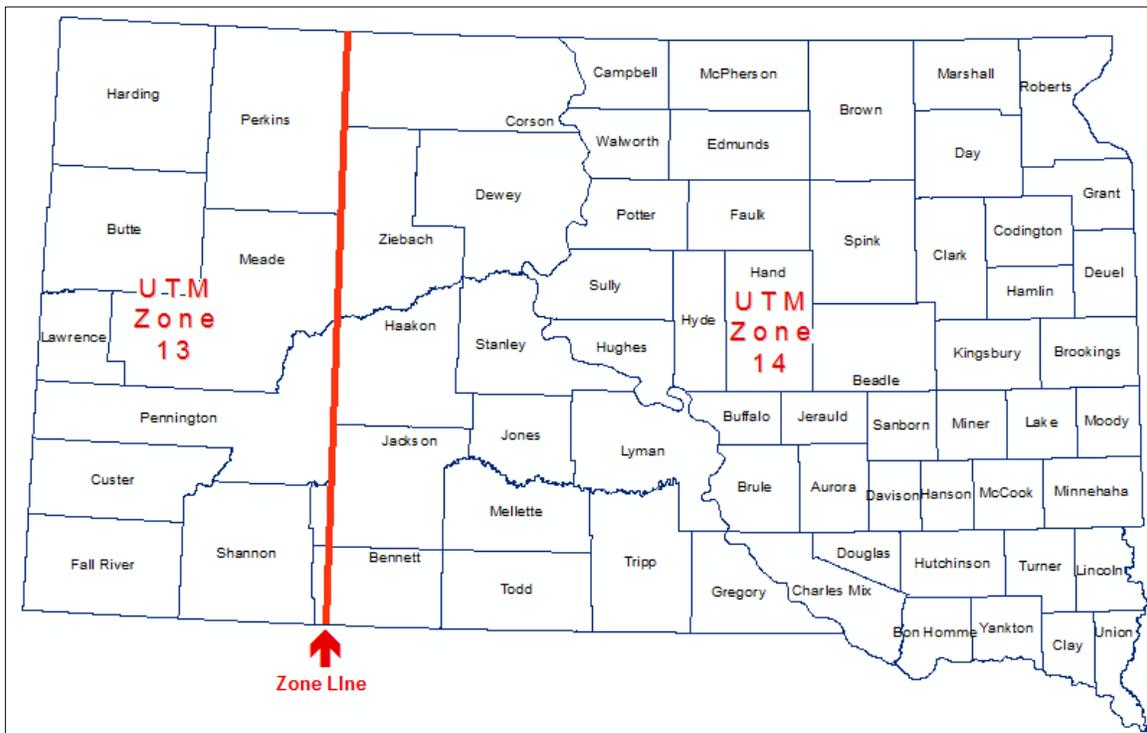
Figure 6: Map of South Dakota showing the two UTM zones and the line of demarcation between the zones.

- Enter the easting and northing coordinates (Figure 7). The easting coordinate AL-WAYS has six (6) numbers before the decimal. The northing coordinate has seven (7) numbers before the decimal. After entering the coordinates click OK. Google Earth will place a yellow stickpin (placemark) at the coordinates you indicated (Figure 8). If you do not see the stickpin you may be zoomed in too far. Try zooming out. If you still do not see the stick pin try the process again.
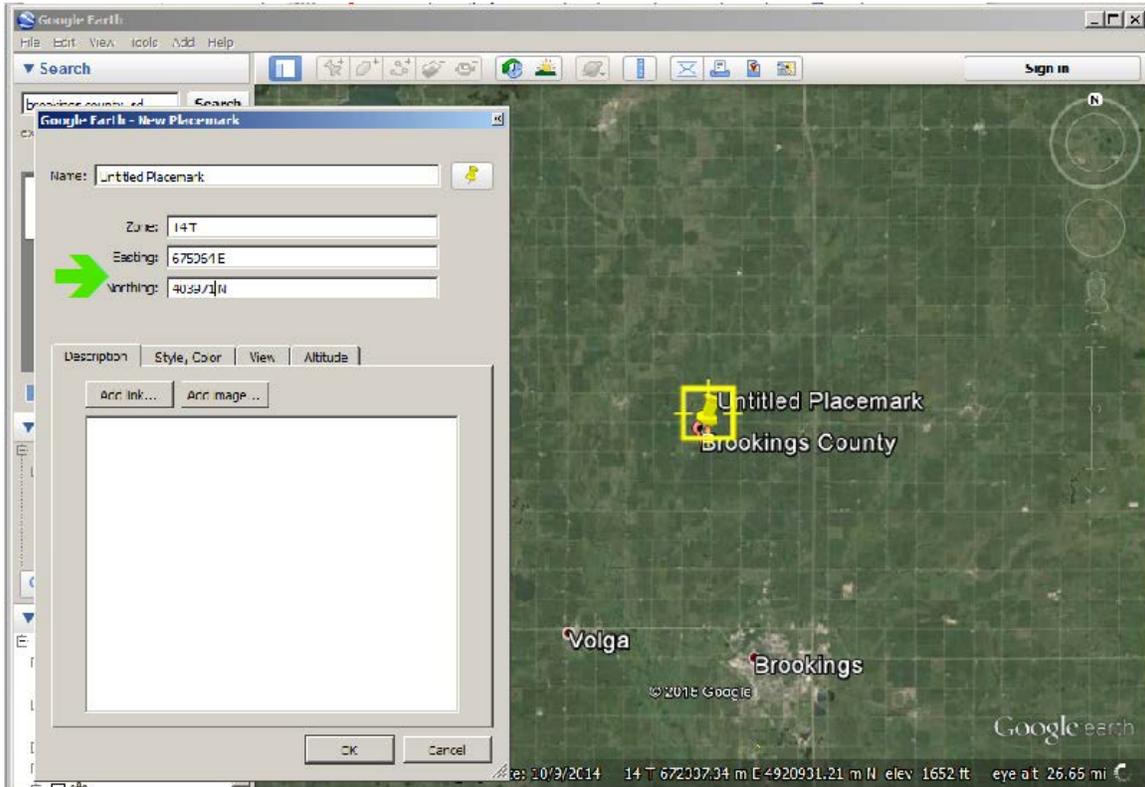
Figure 7: Enter the easting and northing coordinates and then click OK.
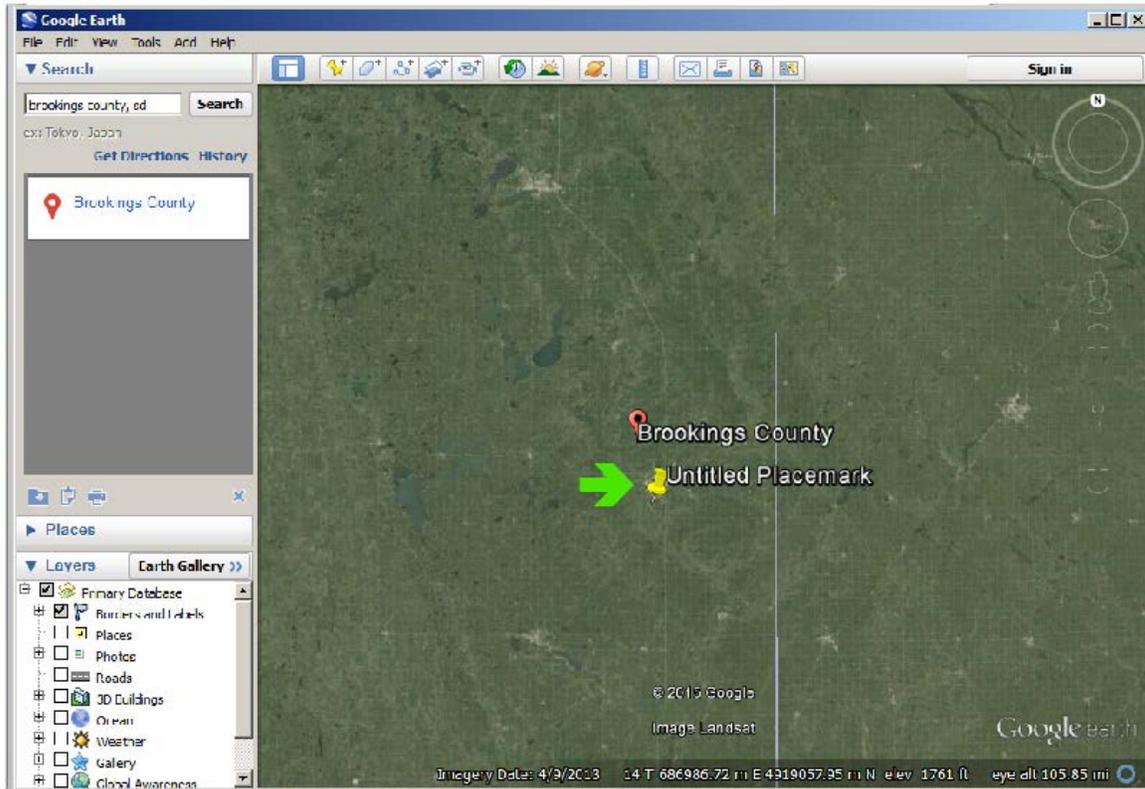
Figure 8: A placemarker will appear at the location of the UTM coordinates you entered.

- You can then zoom into the location indicated by the yellow stickpin (Figures 9 and 10). As you zoom in the view goes from directly overhead to an angled view from the south. For accurate information the view must be from directly overhead so press the R key. This will straighten the view. Always perform this step before gathering any data or saving the image.
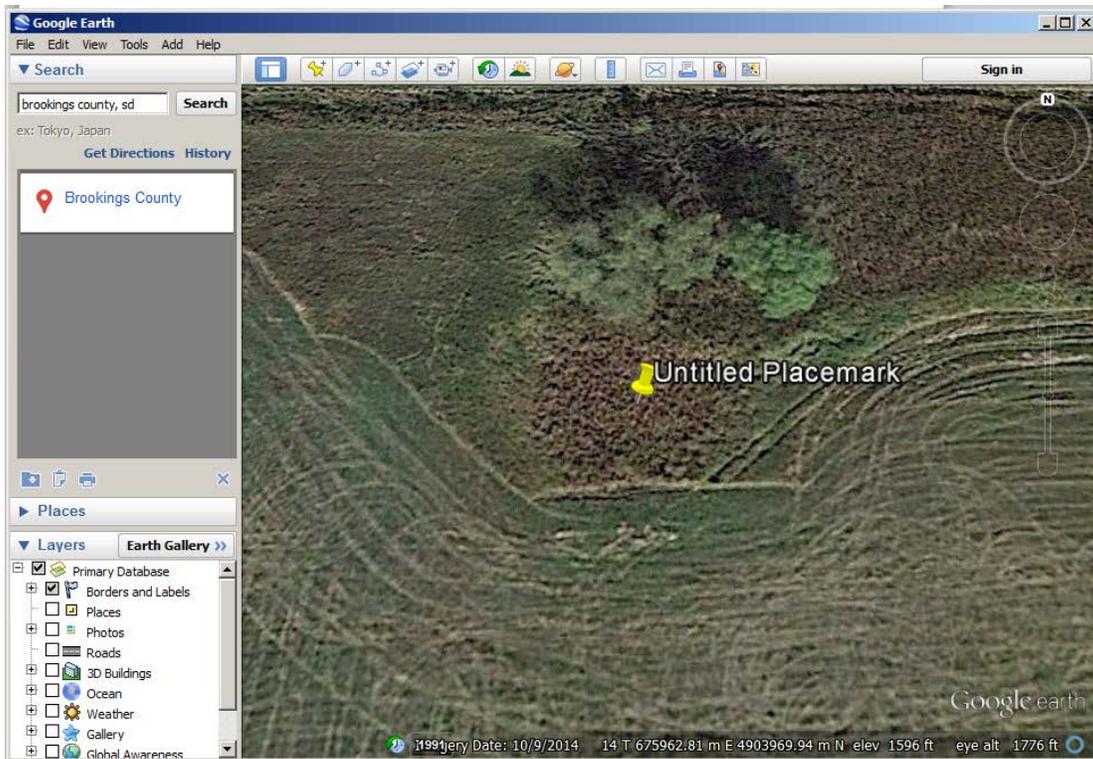
Figure 9: Angled view.
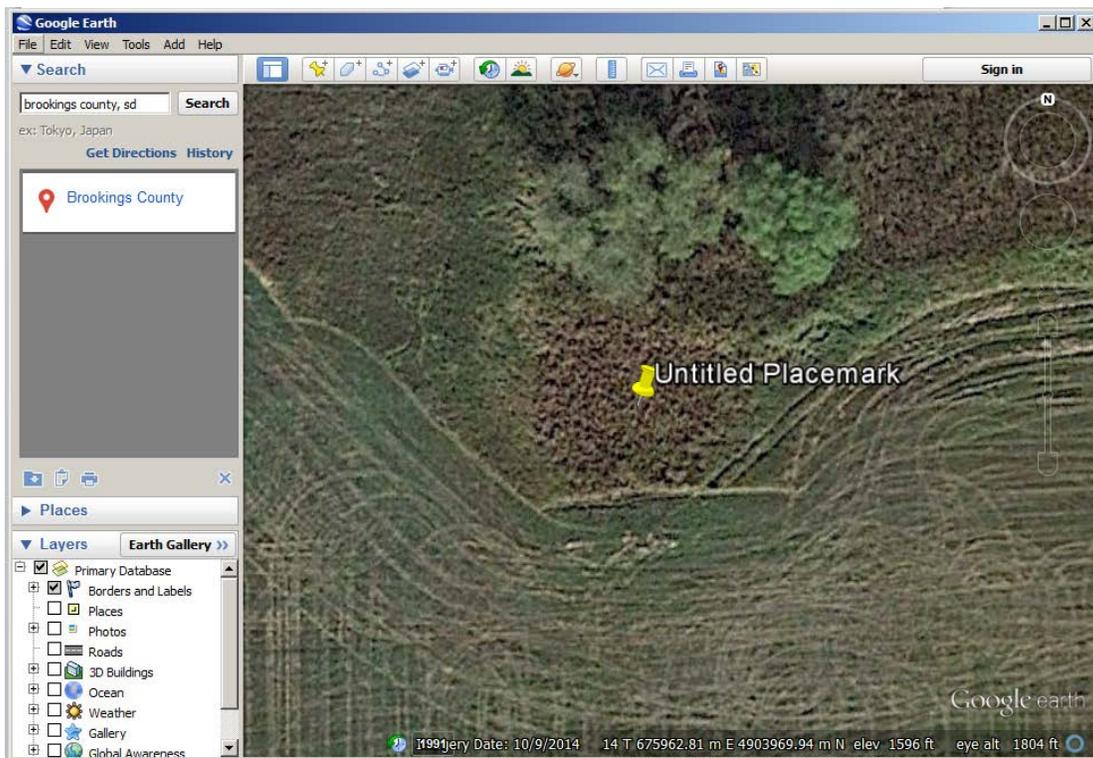
Figure 10: View from directly overhead after pressing the R key. In this demonstration there is only a slight difference but when you do it on your computer screen the difference will be easily detected.

- Using whatever method you choose to find the site location, zoom in and center on the location, making sure the view is from directly overhead.
- You can now draw and measure the site boundary and determine the UTM coordinate for the site form. You will then need to capture the image to send with your site form and save it as a .kmz file to email to the GIS Coordinator for placement into the ARC's GIS databases.
- If you created a placemark you can remove it by right clicking, then choosing delete from the dropdown box.
- To draw the site bounary click on the polygon tool on the toolbar above the display window (Figure 11). A windows called New Polygon window will appear. You will probably have to move it a little bit in order to continue (Figure 12).
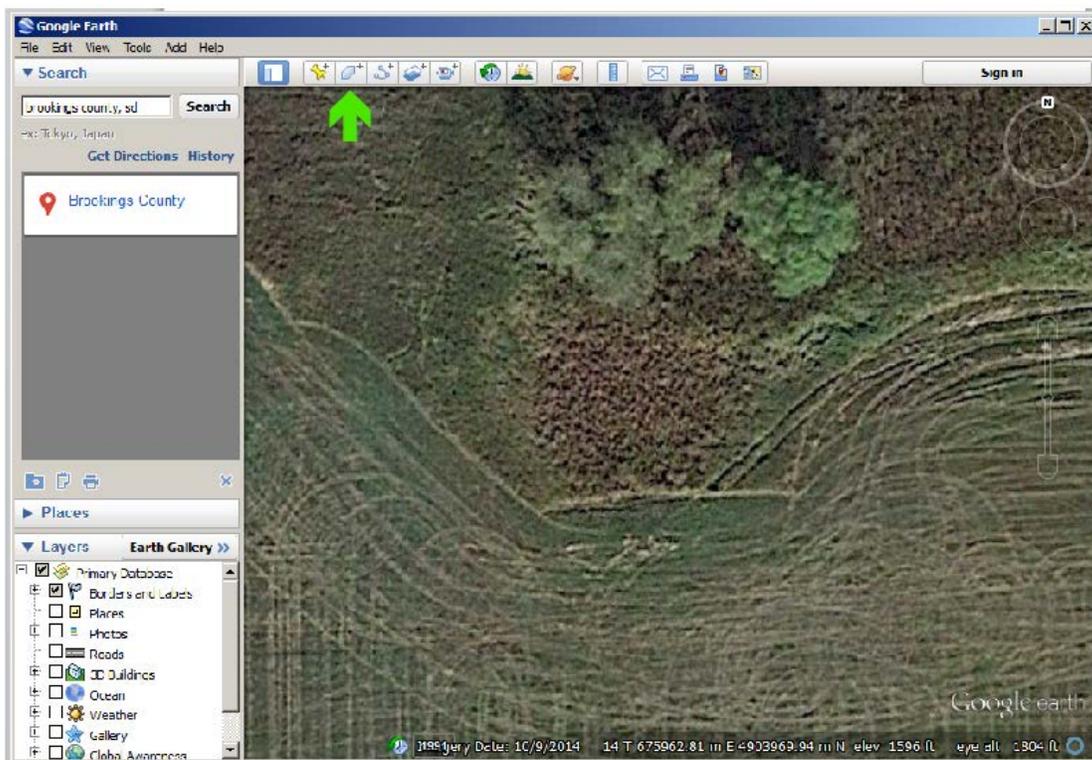
Figure 11: Choose the polygon tool to draw the site boundary.
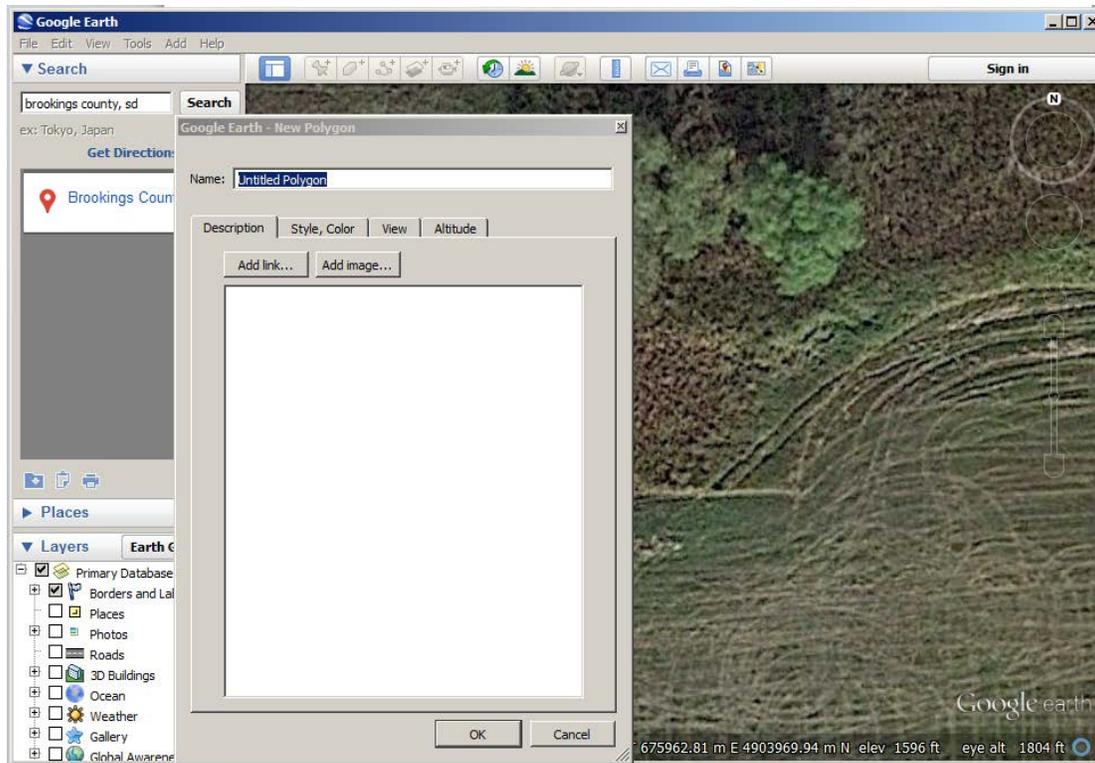
Figure 12: After clicking on the polygon tool on the tool bar a window will appear that you will have to move in order to continue.

- At this point you will need to experiment and figure out the best and easiest way for you to draw the site boundary. Move the mouse cursor to the place on the display window where you want to start drawing the site boundary (the first time you use this function of Google Earth the boundary you draw will be white but that is easily changed). The mouse cursor will change to a box and when you click a point will appear (Figure 13). Continue to click your mouse to create the shape you want for your site boundary. The first time you use this tool the boundary will more than likely be white with a white interior (Figure 14). You will need to change this.
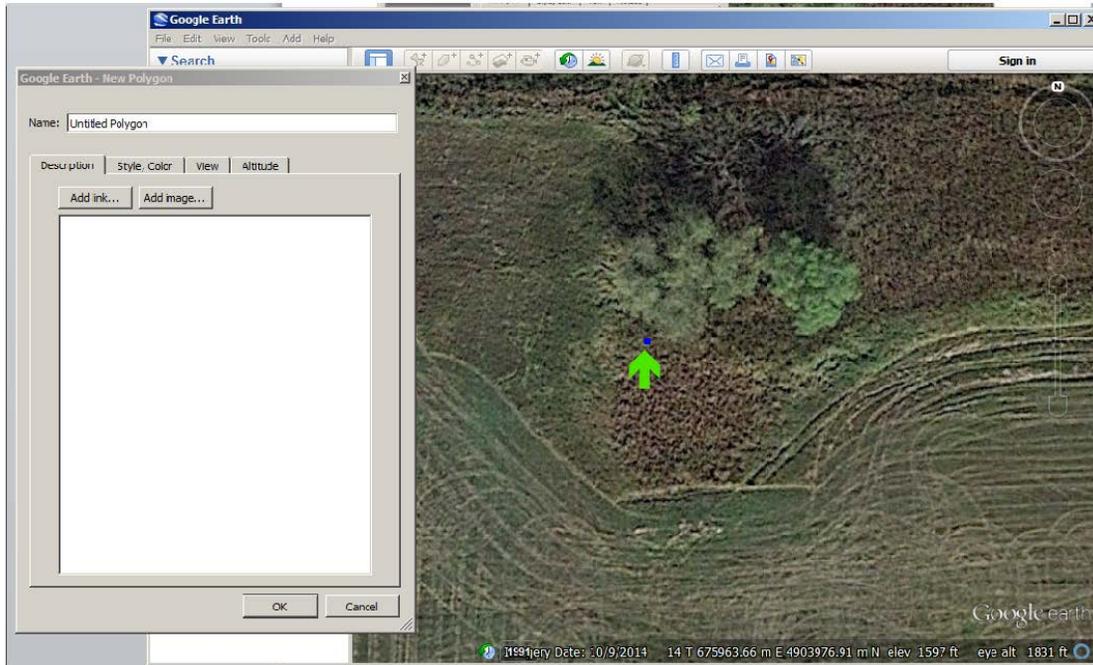
Figure 13: A point appears when you click the New Polygon mouse cursor to create the polygon.
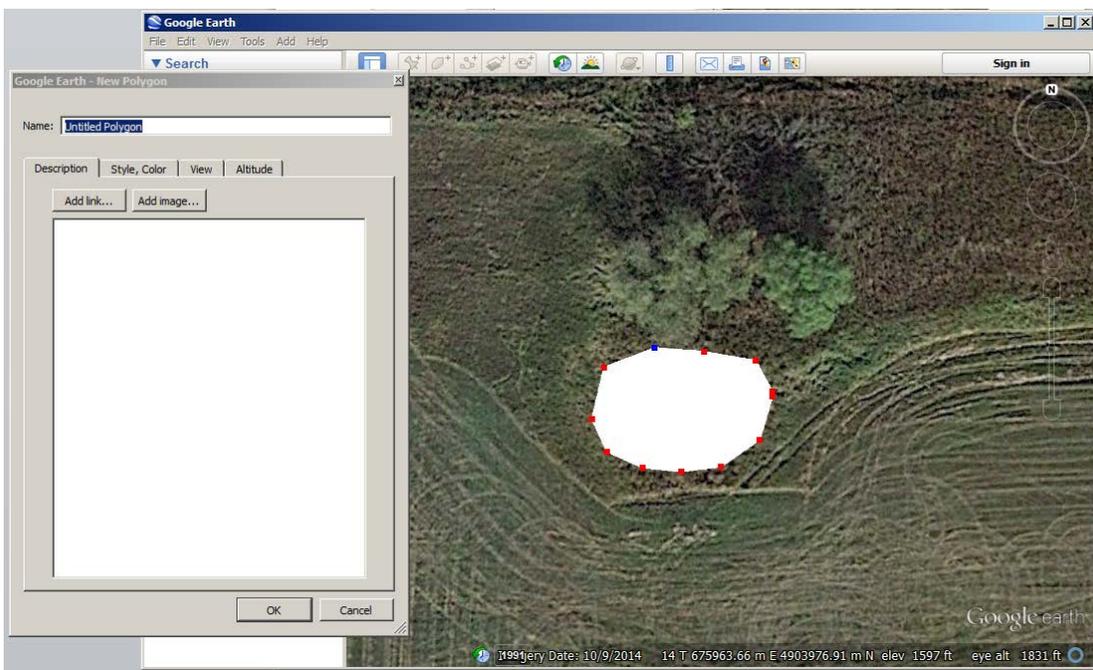
Figure 14: The first polygon you will create will more than likely be white with a white interior.

- In the New Polygon window click on the Style, Color tab. You will see that the Lines color is white with a width of 1, and the Area color is white and set to Filled+Outlined (Figure 15). You will need to change the Lines Color and Width to a color and width that is easily visible. You will need to change the Area Color from Filled+Outlined to Outlined (Figures 16).
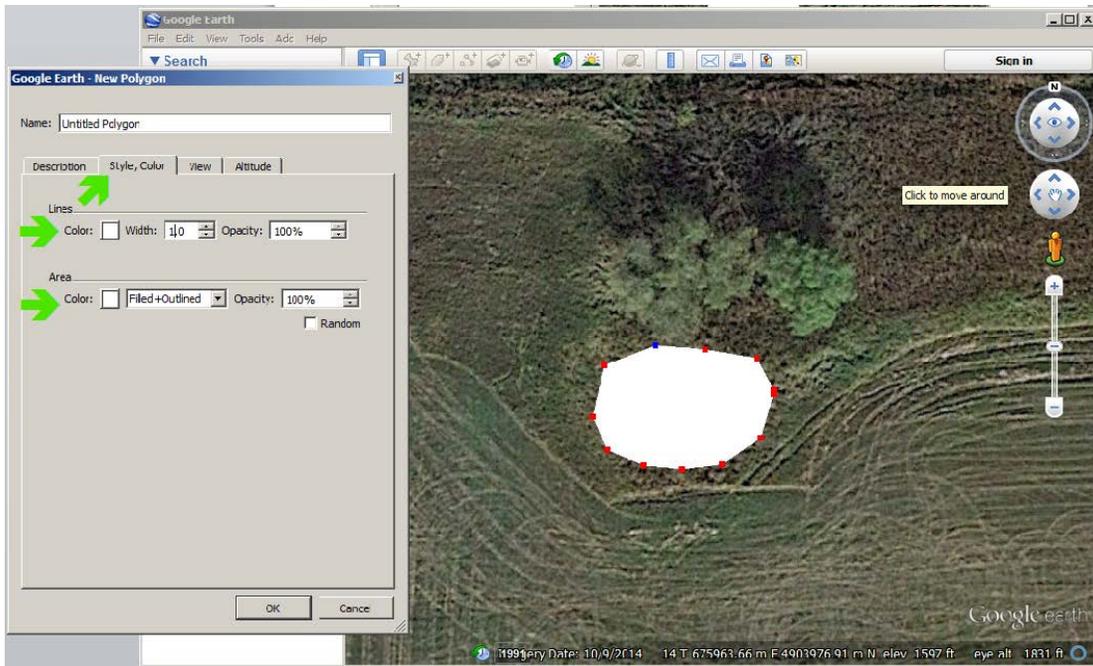
Figure 15: Choose they Style, Color tab and notice the Lines and Area settings.
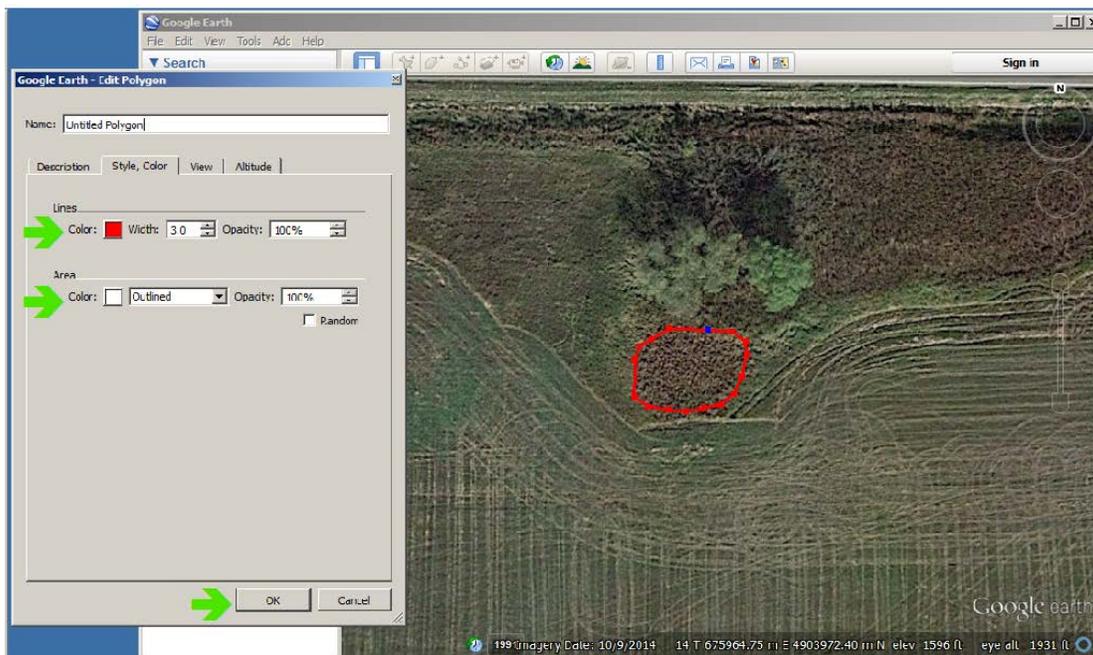
Figure 16: Change the Lines Color and Width to a color and width that is easily visible. Change Area from Filled+Outlined to Outlined. When you are done click OK.

- After you have drawn the polygon you can then measure the size of the site boundary. Click on the ruler tool on the toolbar above the display window (Figure 17). The Ruler window will appear. You will need to set the Map Length on the Line tab in that window to meters. Click the Map Length dropdown box and choose Meters from the list (Figure 18).

• Move the mouse cursor to the area you want to measure. The mouse cursor will change to a square. Place the center of the square at the point where you want to start measuring and click the mouse, then move the mouse to point where you want to end the measurement. As you move the mouse a line will appear. After you click the mouse to end the measurement, record the measurement shown in the Map Length field (Figure 19). Continue this process for all necessary measurements. NOTE: please ensure that the site boundary measurements made in Google Earth match those on the site form.
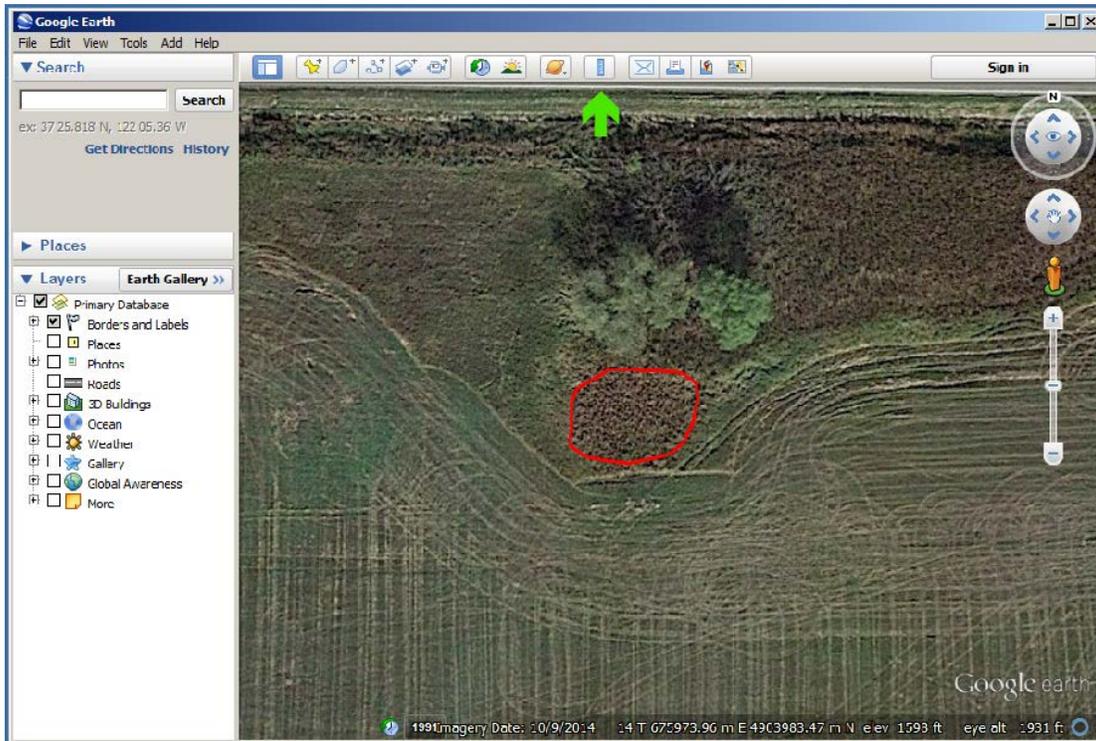
Figure 17: Choose the ruler tool to measure the site boundary.
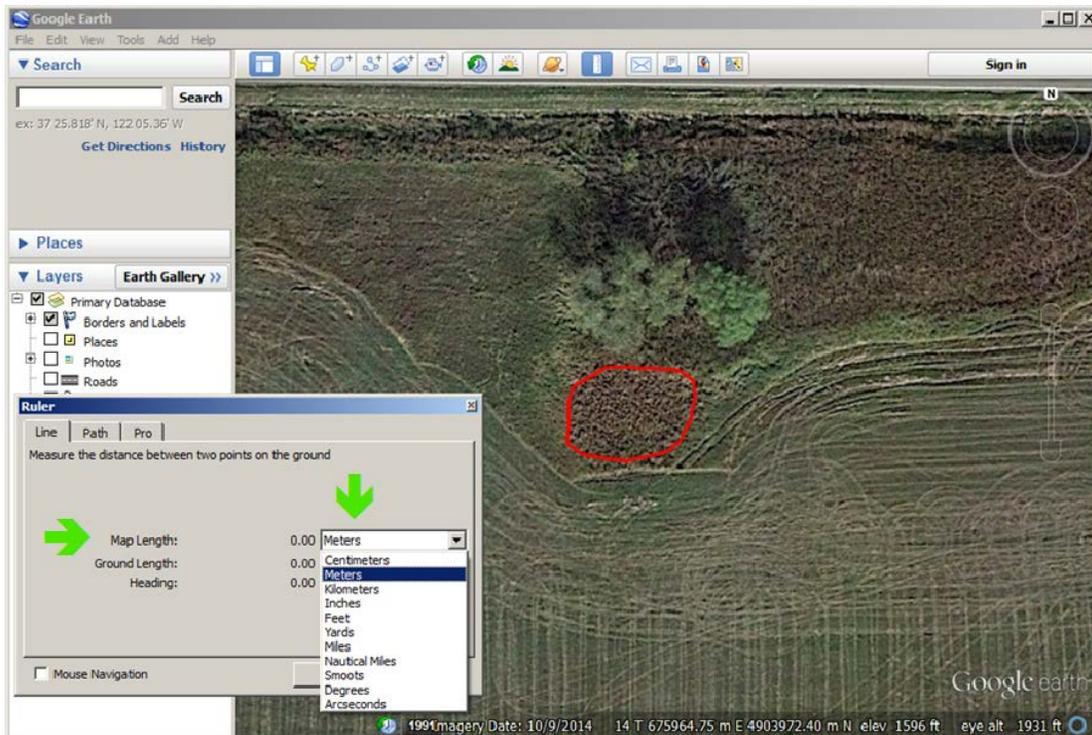
Figure 18: In the Ruler window on the Line tab change Map Length to Meters.
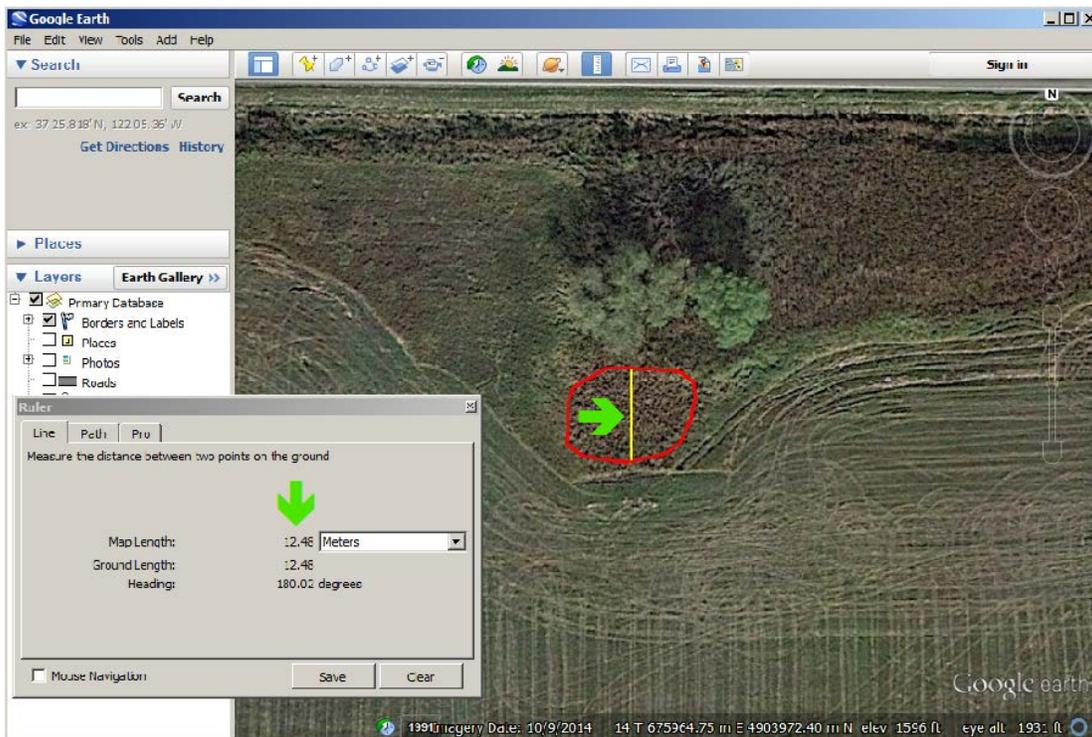
Figure 19: Measure the site boundary and record the measurement in the Map Length field.

- You can also get the UTM zone and coordinates and elevation needed for the site form from the bar on the bottom of the Google Earth window (Figure 20). To get the

required UTM coordinate for the center of the site, and the site elevation, hover the mouse over the center of the site boundary and write down the easting and northing and also the elevation.
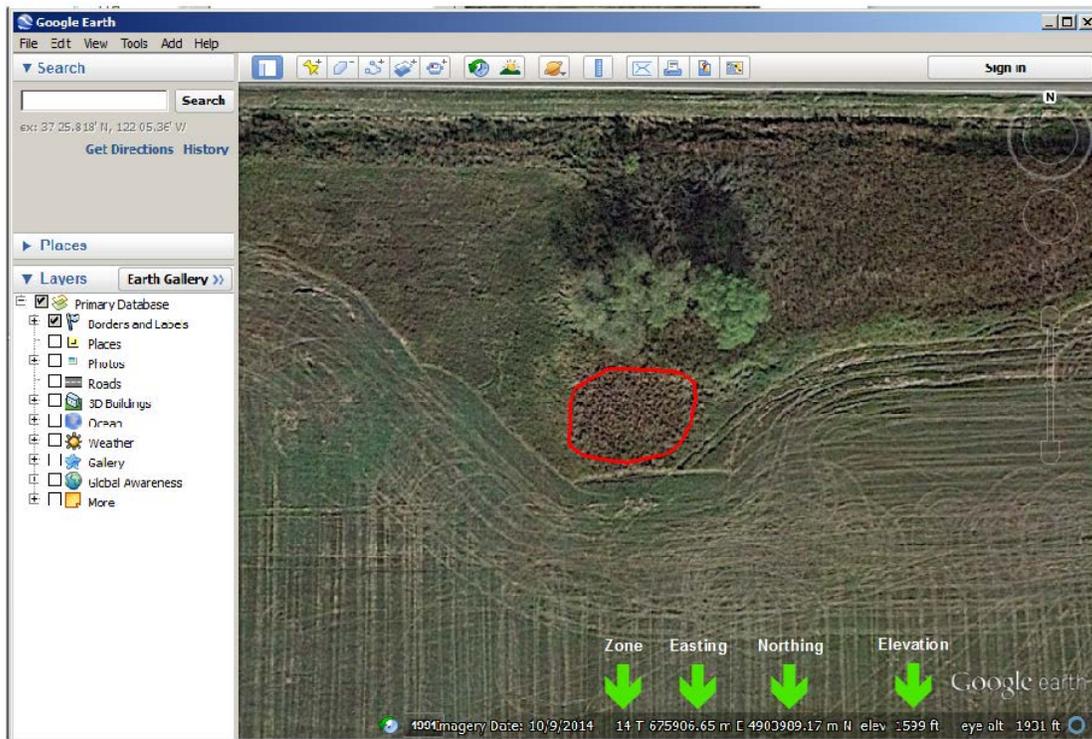
Figure 20: The UTM zone and coordinates and elevation are available at the bottom of the Google Earth window.

- Finally, you need to include this image in your site form and save the image as a .kmz to email to the GIS Coordinator. The .kmz file can be converted to a shapefile that can be imported into ArcMap and used to accurately place the correctly sized site boundary into ArcMap.

- To copy and paste the image for inclusion with the site form first press the R key to ensure that the image is shown from directly overhead. Next; click on the Edit on the main tool bar, then click on Copy Image (Figure 21). You can then paste this image into any application that supports the Microsoft paste function. Please send this image with the site form.

- To create a .kmz file to email to the GIS Coordinator click on File and chose Save from the dropdown box. From the Save dropdown box select Save Place As (Figure 22). A Save File box will appear and you will need to give the same name to this file as the field number you assigned to the site. The file you save will have a .kmz extension – you will need to email this file to the GIS Coordinator.
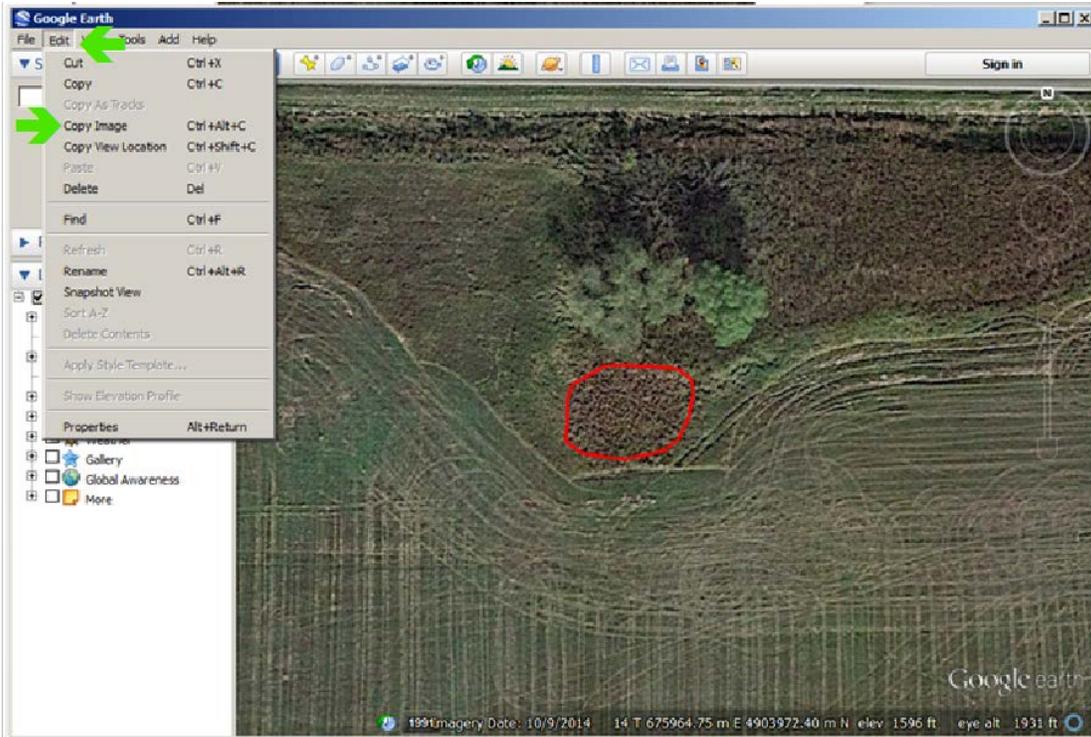
Figure 21: Copy the image for inclusion with the site form.
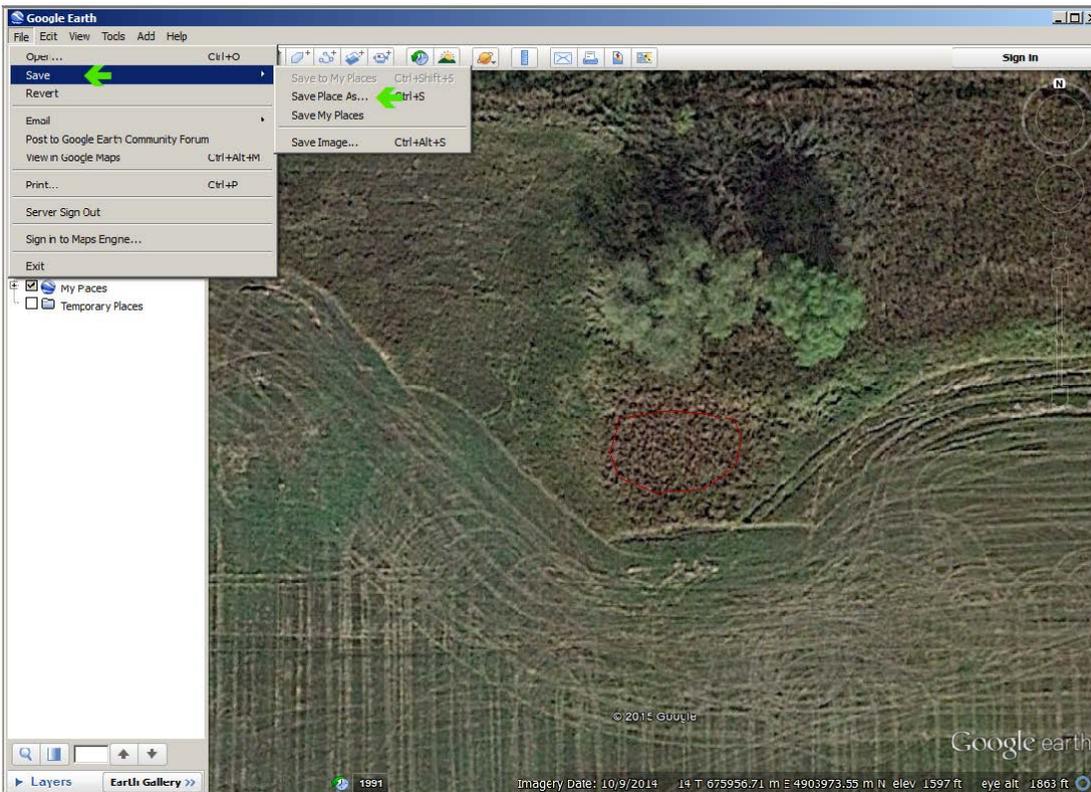
Figure 22: Save the image as a .kmz file to email to the GIS Coordinator.