Site Calibration using Trimble Access 2022

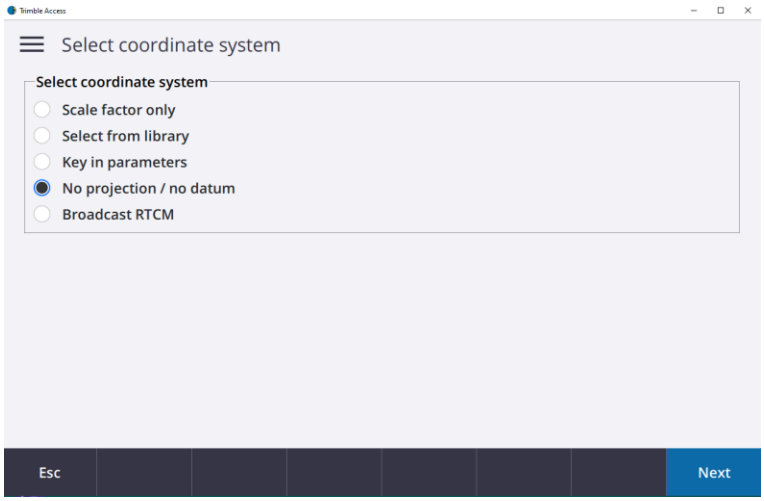
A site calibration is performed to enable a GNSS Receiver to operate within a Local Grid coordinate system.

Before performing a site calibration it is important you are familiar with the theoretical basis behind the process. In short, a minimum of 4 calibration points should be used, and they must fully surround the work area.

To perform a site calibration you need a set of ETRS89 lat/long coordinates that are known to a high relative accuracy but not necessarily absolutely. These can be observed in the field as RTK or VRS observations. You will also need a set of high-quality Local Grid coordinates for the same points.

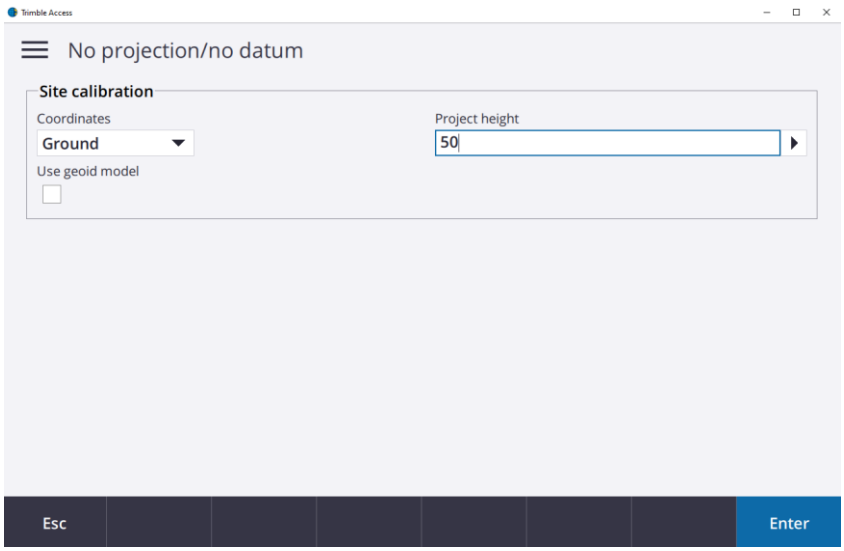
The Local Grid points can be keyed into the job, imported, or linked to it from a CSV file.

Start off by creating a new job. On the job creation screen it is important to set the coordinate system to **No Projection / no datum.** To do this press the Coord. Sys. button on the job creation screen. On the next screen select the No Projection / no datum option, as shown below:



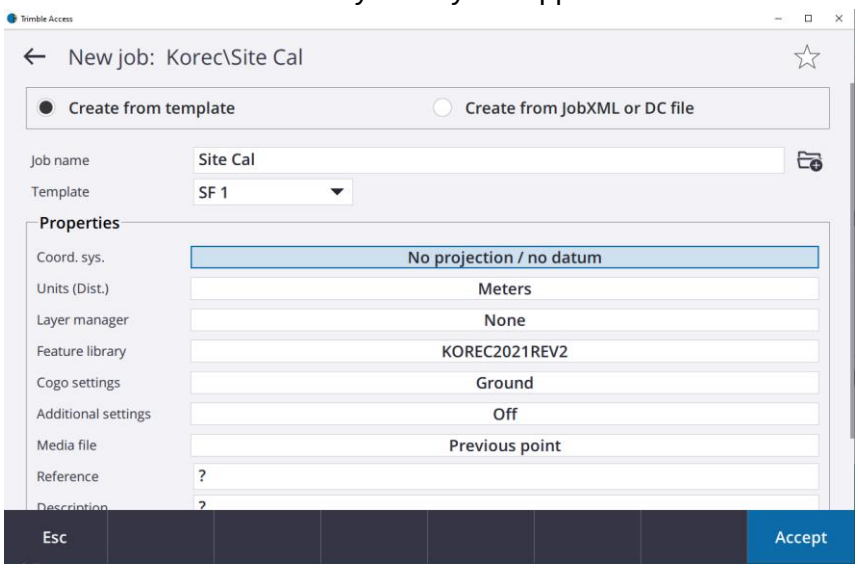
When creating a No projection / no datum coordinate system it is important to specify whether the Local Grid points are provided in Grid or Ground units. If measured with a total station then Ground should be selected.

The mean ellipsoidal project height of the survey area should also be entered; in the UK this is approximately ODN elevation +50m. Pressing the Here button will populate the dialogue with the ellipsoidal height of your current position. An example entry is shown below:



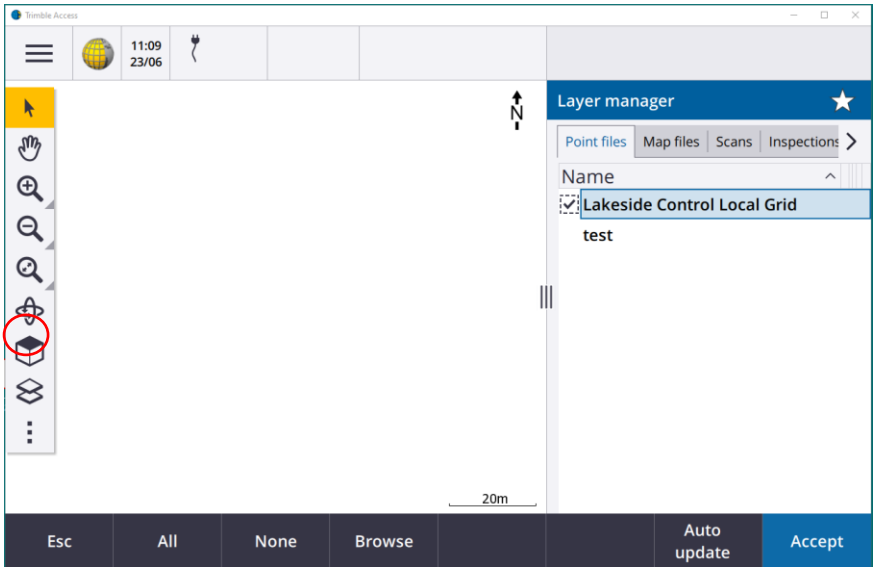
Optionally a geoid model can also be used (OSGM15).

Once entered the Coord. Sys. entry will appear as shown:

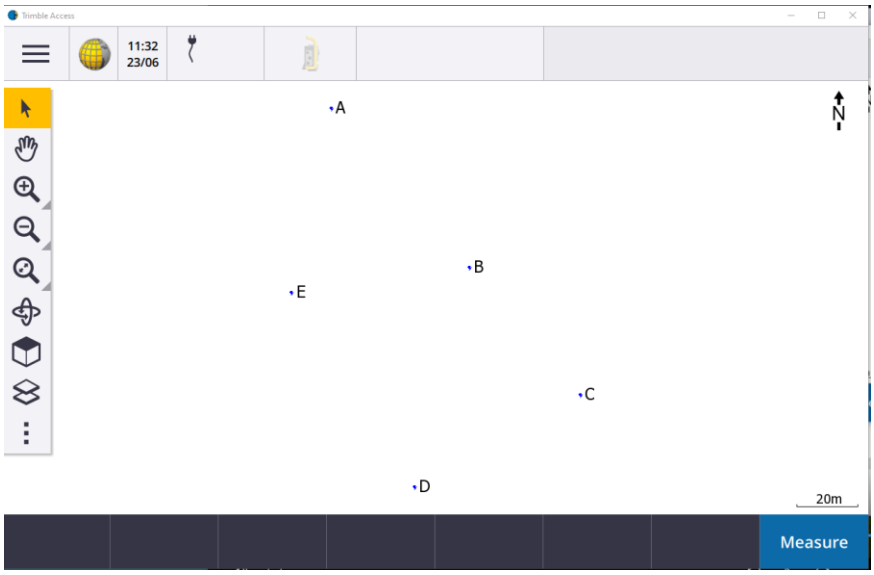


Complete the creation of the job.

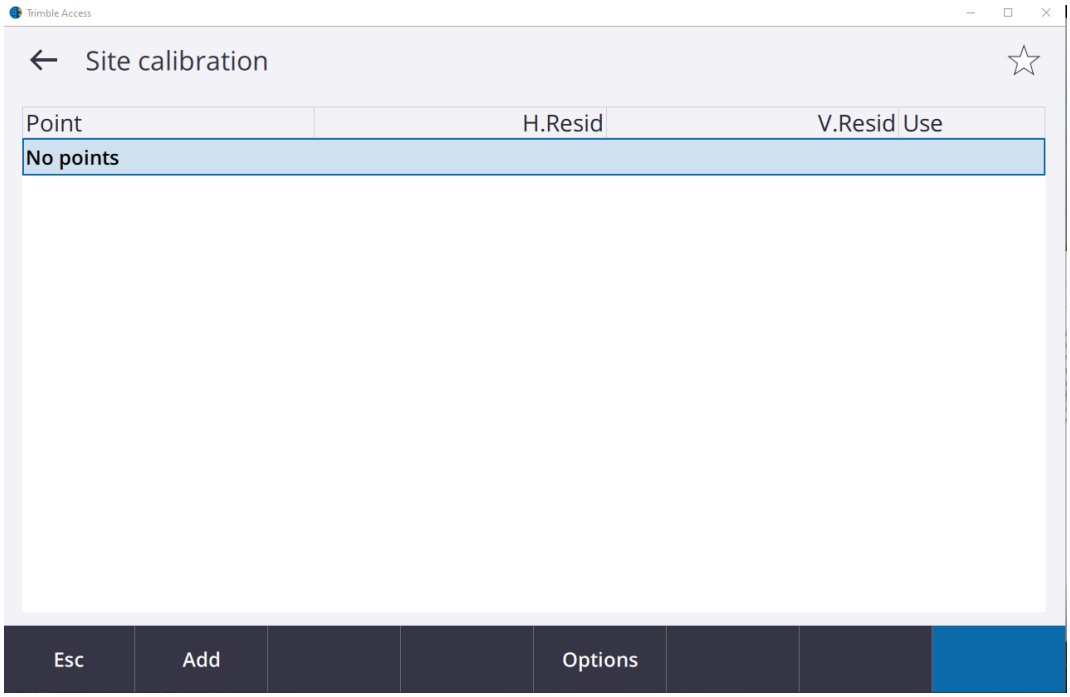
Firstly, we need to link the local co-ordinate file of the control points to the job by tapping on the layer manager icon and tapping on the CSV file you have copied into the Trimble Data folder



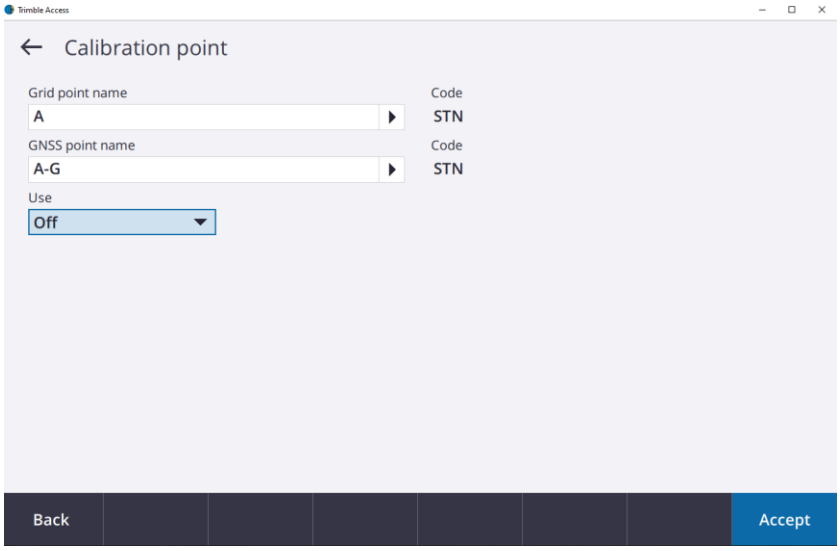
Tap Accept, and zoom extents to show the points



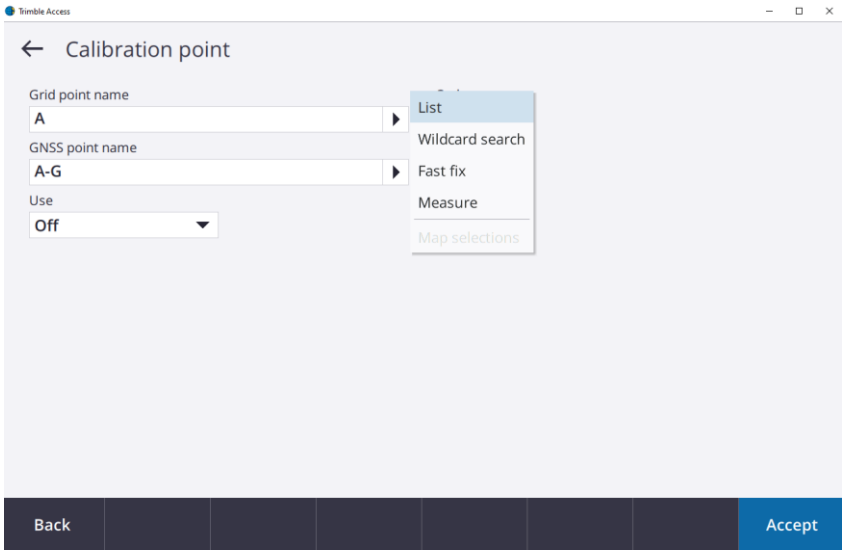
Now, you will start to measure each of the points by tapping Measure and select site calibration. The Site calibration window will open



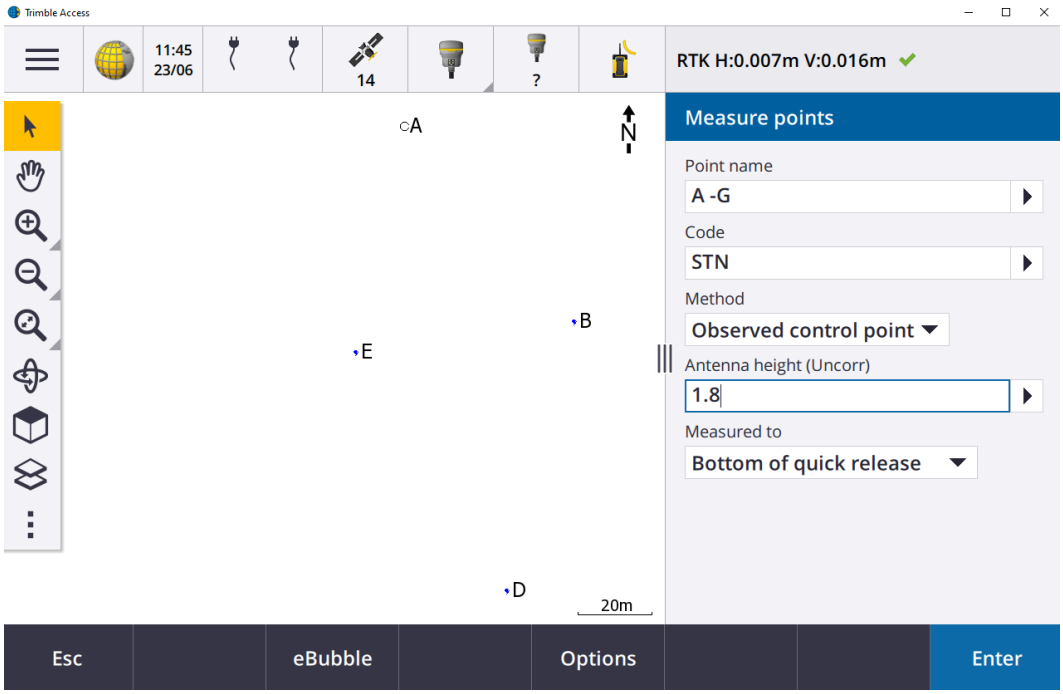
Press the Add button to select the first pair of points coordinates (Grid & GNSS). On the next screen, type in the name of the Local Grid coordinate point or click on the arrow at the end of the Grid box and choose the list option to select it. In the example below the Grid coordinate for the first calibration pair has the name **A**



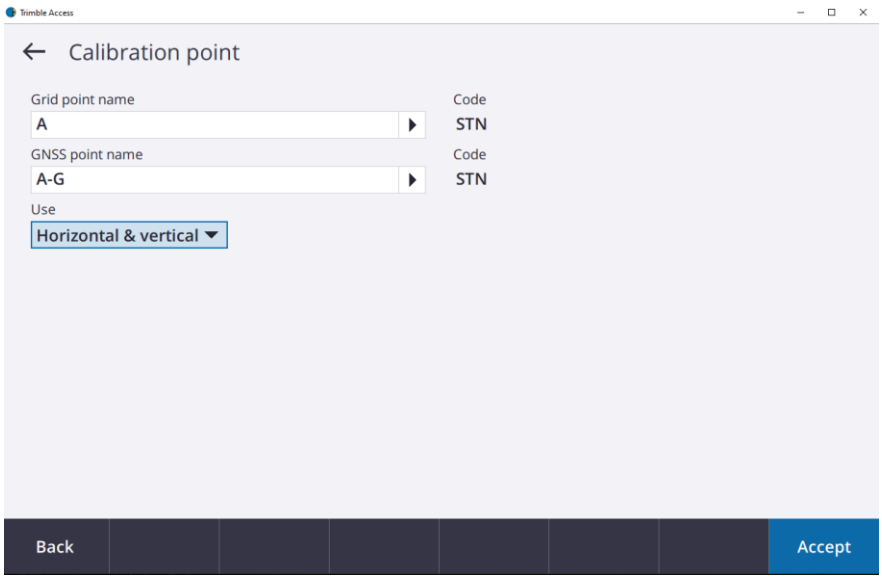
Next enter a name into the GNSS point name box, tap on the right facing arrow and select **Measure**.



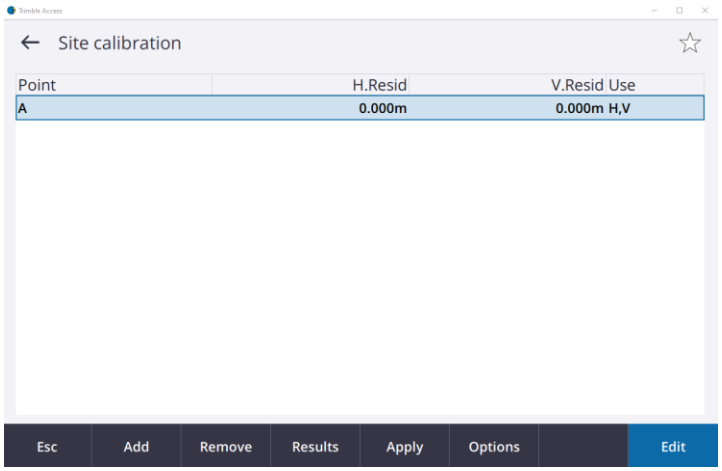
The observation method should be set to Observed control point or Calibration point. Set the Antenna height and measured to position, and carefully measure the calibration point.



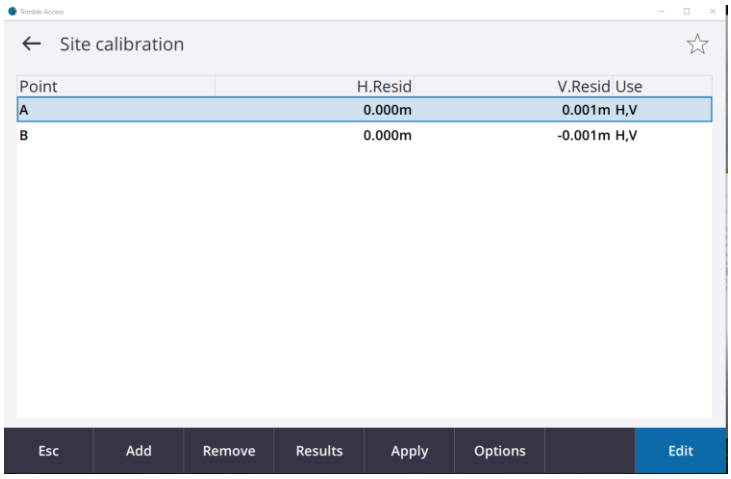
Once the point has been measured, the previous screen will appear showing the name of the Grid and GNSS points.



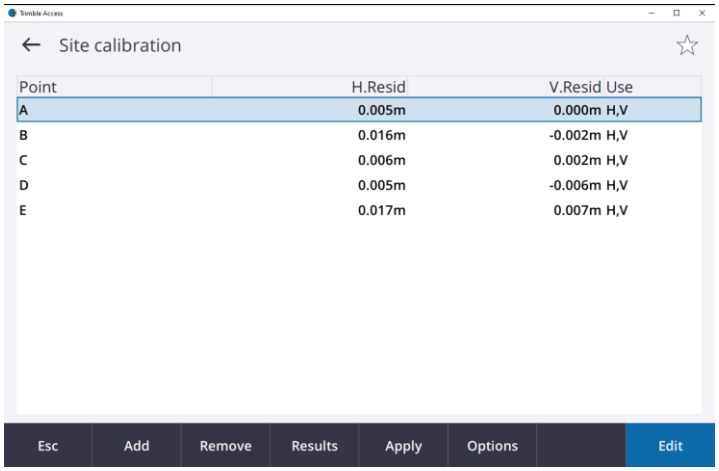
The screen above shows that by default both the Horizontal and vertical coordinate components will be used to compute the site calibration. Later it might be necessary to change this parameter to Off, Horizontal only or Vertical only. Press Accept to return to the Site calibration point table.



Move to the next calibration point location and press the Add button. Repeat the steps to add a second Grid and GNSS point pair to the calibration. In the example below a second point pair has been measured.



In the example below, 5-point pairs have been measured.



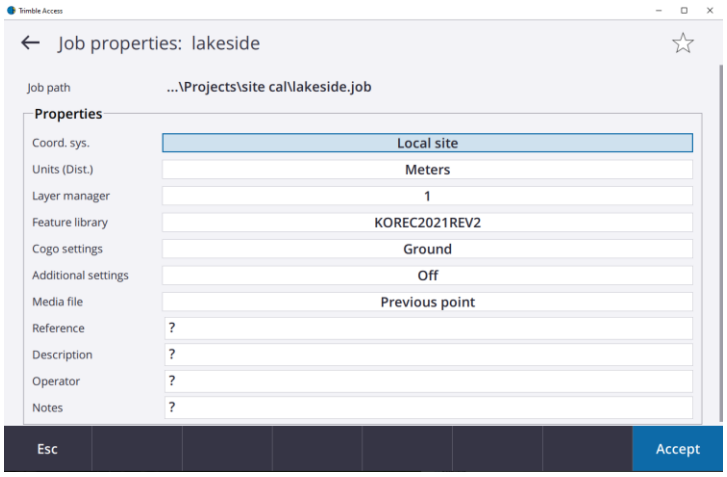
Note after more than 4-point pairs have been measured, both the horizontal and vertical residuals are shown. If a residual is considered too high, after checking the points used, it is possible to tap on the line relating to the point and set its usage to Off, Horizontal only or Vertical only. The residuals for all the points will then recalculate.

The residuals should fall within the measurement precision range of the GNSS survey method used. When satisfied that the residuals are acceptable values, press the **Results** button. Check that the reported scale factor is close to 1 (0.9999x or 1.0000x).

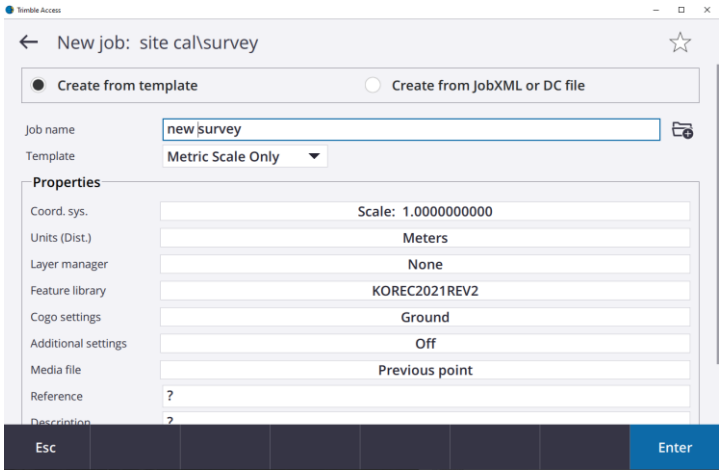
Press **Apply** to apply the results of the calibration as the coordinate system for the job.

Survey a check point with known Local Grid coordinates to test the result of the calibration; this could be one of the points used in the calibration or ideally one that isn't.

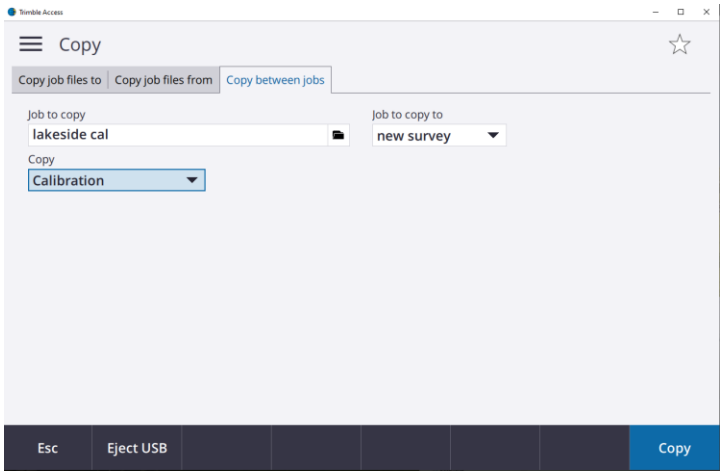
When a Site calibration is applied to a job, the Coord. Sys. will appear as Local Site in the Job properties screen.



It is a good idea to keep the Site calibration job as a separate job and not use it for surveys or setting out. To transfer a calibration to new jobs, from the Jobs menu – create a new job.



Then copy the Calibration from the calibration job to the new job. See screen shot below.



Important Considerations for Site Calibratoin

- Use a No Projection / No Datum coordinate system
- Control Stations used in the calibration must be spread around and enclose the site
- Use at least 3 well-spaced-out points in the calibration for the vertical adjustment
- Limit work to within the extents of the Control
- Residuals should ideally all be below 20mm
- The scale factor should be very close to 1 (Results screen)
- The slope of the Inclined plane should be less than 30ppm (Results screen)
- If calibrating to one or two points only, use the Constant Shift method instead of Inclined Plane for the vertical adjustment (Press Options button at base of Site calibration screen to switch)