



HELP

TRIMBLE® ACCESS™  
SOFTWARE

Land Seismic

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# Land Seismic

## Introduction

### Land Seismic Introduction

Welcome to Trimble® Access Land Seismic software version 1.70 Help.

This application streamlines the land seismic stakeout process, which includes guidance to the point being staked as well as navigation to the nearest bin, if an offset is required. The use of GPSeismic XZO exclusion zones during stakeout ensures that stakes are not incorrectly positioned. Keying in seismic points using the GPSeismic grid definition file makes entering additional points extremely easy.

This application also eases tracking of individual surveyor's activities by maintaining a track log that contains the path that the surveyor followed during the day, specifically calling out any incursions that the surveyor made into exclusion zones. These logs cannot be viewed or edited on the controller, but are automatically imported with the survey data in QuikView.

This document covers features that are unique to the Trimble Access Land Seismic software. For all other features, refer to the Trimble Access General Survey help.

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## Exclusion Zones

Use exclusion zones to be notified when you enter a restricted area, or try staking a point in a restricted area. Exclusion zone files have the extension .xzo and can be created by using the GPSeismic software, or can be created from the Map in the Land Seismic software. Alternatively, you can use an ESRI format shape file (extension .shp) that contains polygon definitions (POLYGON, POLYGONM or POLYGONZ), and uses grid coordinates, directly as an exclusion zone file.

### Selecting an Exclusion Zone file

1. From the main menu, select *Jobs / Exclusion zone*.
2. Select an appropriate *Exclusion zone file* (\*.xzo or \*.shp) for your job.
3. If using a shapefile (\*.shp) instead of an xzo, the *Zone Name Source* option appears. In the *Zone Name Source* droplist, select the name of the field from the \*.dbf attribute table associated with the shapefile from which to read the name of each zone. Only dbf fields of string or text type will be presented. In addition, the list item *Shapefile Name* will always be present; selecting it will use the

- name of the shapefile as the attribute for each zone.
4. Select a *Map display color* for the exclusion zone file. On the Map, the exclusion zones will appear as hatched areas in the specified color.
  5. Select the *Beep when user enters exclusion zone* check box to specify that you want to have the system beep to be issued continuously while a user is in an exclusion zone. This entry and exit recording can only be done when there is a current position available. The beep will occur roughly every second while the user remains within the exclusion zone.
  6. Select a *Stakeout check interval* to indicate how often the current position should be checked to determine if the current position is within the exclusion zone.
  7. Tap *Accept* to confirm the settings and close the select exclusion zone dialog.

### Notes

If you want to use an exclusion zone but do not want it to check while navigating to points, set the *Stakeout check interval* to Never. This will not impact the basic logging capabilities, measuring a point, or the warning that occurs when staking a point. The *stakeout check interval* setting only controls the coloration of the inline/crossline offsets and display of the exclusion name in the stakeout window.

Setting the *Stakeout check interval* to Auto means that the software will use the size of the exclusion zone file to determine how often the exclusion zone is checked. The software calculates how long it would take to check the exclusion zone and then multiplies that number by 10 to come up with the *Stakeout check interval* . If the minimum value is used, the auto stakeout check interval is one second.

## Creating Exclusion zones from the Map

1. Select one or more points from the map.
2. Tap and hold on the screen and then select *Add exclusion zone* from the shortcut menu.
3. Select the *Exclusion zone type*. Available options are *Point(s) with radius*, *Polyline*, and *Polygon*.

### Notes

- ◆ If using a shape file as an exclusion zone file you cannot add new exclusion zones to it - the *Add exclusion zone* option will not appear in the shortcut menu when using a shape file.
  - ◆ You must have at least two points selected to define a polyline and at least three points for a polygon.
  - ◆ For Polyline and Polygon creation, points must be selected in the order they are to be joined.
4. To select an exclusion zone file, tap  on the *Exclusion zone file* field. Navigate to and select the required exclusion zone file.

**Note** - To create a new exclusion zone file, navigate to the folder where you want to create the file and then tap  . Rename the newly created *Newfile.xzo* . then tap on *OK*.

5. Enter an *Exclusion zone name*. The exclusion zone name allows you to describe the exclusion zones, and appears in a warning if you try to key in, stake out, or store a point in an area that is within an exclusion zone.
6. Enter a *Radius* if your exclusion zone type is set to Points with radius. The exclusion zone created will be a circle or circles with the defined radius about the selected points.

7. Tap *Add* or press *Enter* to create the exclusion zone.

**Note** - If there is no current exclusion zone file, or if the one selected under *Jobs / Exclusion zone* differs from the exclusion zone file specified when creating the exclusion zones, then the following message appears: *Set <exclusion zone.xzo> as the current zone file?* Where *<exclusion zone.xzo>* is the file name specified when creating the exclusion zones. Tap *Yes* to make it the current exclusion zone, or tap *No* to keep the existing settings.

## Deleting Exclusion zones

You can delete an exclusion zone from an XZO file provided the exclusion zone was created in the Land Seismic software. To do this:

1. Ensure that the exclusion zone file (\*.xzo) that contains the exclusion zone that you delete is selected in *Jobs / Exclusion zone*.
2. From the main menu, select *Jobs / Map*.
3. Tap on the perimeter of the exclusion zone.
4. Tap and hold on the screen and then select *Delete exclusion zone* from the shortcut menu.

**Note** - If you try to delete an exclusion zone that was not created by the Land Seismic software, the following message appears: *Only zones created on the controller can be deleted*.

## Point buffer circles

Point buffer circles are used if you want the vibroseis trucks to stay a certain distance away from points. Unlike exclusion zones, point buffer circles are display only. There is no warning if you enter a buffer circle. To define point buffer circles:

1. From the main menu, select *Jobs / Exclusion zone*.
2. In the *Point buffer circles* group box set the *Radius* and *Map display color*.
3. Tap *Accept* to store the changes or *Esc* to abandon the changes.

To display point buffer circles:

1. Go into the map.
2. Tap and hold on the screen.
3. Select *Show point buffer circles* from the shortcut menu.

To hide point buffer circles in the map:

1. Tap and hold on the screen.
2. Select *Hide point buffer circles* from the shortcut menu.

## Key in Seismic Grid Points

Use the Seismic grid points option from the Key in menu to create points in terms of a Grid definition file

from GPSeismic.

1. If your project has exclusion zones, you must select an *Exclusion zone* file from the Jobs menu.
2. From the main menu, select *Key in / Seismic grid points*.
3. Select your *Grid definition file* (\*.gdf).
4. In the *Point name* field, enter the track and bin numbers of the point to be keyed in. The grid definition file will be used to calculate the northing and easting of this point. For example, if the track number is 1016 and the bin number is 5024, enter the point name 10165024.

**Note** - If you enter an invalid track or bin number, an error message shows the valid range of numbers.

5. Key in an *Elevation*, if required.
6. Key in a *Feature code*, if required.
7. Tap *Store* to add the point to the database.

**Note** - If the point falls within an exclusion zone, the coordinates will be colored red. When you tap *Store*, the following message appears, *This position is in an exclusion zone*, followed by the exclusion zones name. Tap *Cancel* to edit the point, or tap *Continue* to store the point anyway.

## Seismic Stakeout

Use this option to stake out points in terms of a track azimuth from one of the following methods:

- [Grid definition file](#)
- [Crooked line file](#)
- [Line](#)
- [Azimuth](#)
- [Azimuth from two points](#)

1. From the main menu, select *Seismic Stakeout*.

### Notes

- ◆ To access Seismic Stakeout from the map, select a point and then tap the *Stakeout* button. Alternatively, select a point, tap and hold on the screen and then select *Stake out point* from the shortcut menu.
  - ◆ If you have more than one GNSS RTK survey style, you must select the correct style.
  - ◆ If your project has exclusion zones, you must *Select an Exclusion Zone* in the Jobs menu before going into Seismic Stakeout.
2. Tap on the *Options* soft key to set up a layout tolerance, configure the as-stake point details or display, or set the other stakeout options.
  3. Set the *Reference method* based on how you want to define the track azimuth:

### Grid definition file

- a. Set the *Reference method* to *Grid definition file*.
- b. Select the Grid definition file (\*.gdf) for your site.

**Tip** - After selecting a \*.gdf file in seismic stakeout, that grid definition file can be viewed in the map. From the map, tap and hold on the screen and then select *Show grid definition file lines* from the shortcut menu.

### **Crooked line file**

- a. Set the *Reference method* to *Crooked line file*.
- b. Select the Crooked line file (\*.crk) for your site.

### **Line**

- a. Set the *Reference method* to *Line*.
- b. Select a line from your current job

### **Azimuth**

- a. Set the *Reference method* to *Azimuth*.
- b. Enter a Track azimuth

### **Azimuth from two points**

- a. Set the *Reference method* to *Azimuth from two points*.
- b. Enter two points to define the track azimuth

4. In the *Point name* field, enter the name of the point to stake, or tap the pop-up arrow and then select a point using one of the following methods:

<b>Method</b>	<b>Description</b>
List	Select from a list of all points in the current job and linked files.
Wildcard search	Select from a filtered list of all points in the current job and linked files.
Key in	Key in the coordinates of the point to stake.

If you select (or auto-increment to), a point in an exclusion zone the following message appears, "Point to be staked is in an exclusion zone", followed by the exclusion zones name. Tap *Cancel* to edit the point, or tap *Continue* to stake out the point anyway.

**Tip** - Tap *Closest* to automatically populate the *Point name* field with the name of the closest point. *Closest* searches the current job and all linked files to find the closest point that is not an as-staked point or a design point for the as-staked points.

5. Enter the Point increment. Do one of the following:
  - ◆ To return to the stake out point screen after staking a point, enter an increment of 0.
  - ◆ To stay in the graphical stake out display and automatically increment to the next point, enter a valid increment value.

**Tip** - You can use a decimal point increment, for example 0.5. You can also increment the numeric component of a point name that ends in alpha characters, for example, you can increment 1000a by 1 to 1001a.

6. Tap *Stakeout*. If you are not already in a GNSS survey, the survey will start.

**Note** - If the antenna height is null in your survey style, you are prompted to set the *Antenna height* and *Measured to* fields.

7. The graphical view shows a large navigation arrow indicating the direction you must travel. Below this is the horizontal distance that you must travel. The Inline and Crossline values of the current position appear on the right of the graphical view. These are relative to the track azimuth and the point being staked. If the Crossline value is small, you will see the Track line on screen.

While navigating, the colors of the Inline and Crossline text indicate important information about your current position. During ordinary navigation, the text remains black. If the current position is within the [Layout tolerance](#) of the target location, the text will appear green. If you are within an exclusion zone, the text is displayed in red and the name of the exclusion zone is displayed on the screen. The green text indicating that you are within the layout tolerance takes precedence over the exclusion zone indicator, so if you are within a zone and at the stakeout location, the labels will appear green.

**Tip** - You can configure how often the system checks to see if the position is within an exclusion zone in the *Stakeout check interval* field in the *Exclusion Zones* options in the *Jobs* menu.

**Note** - If the Reference method is set to Grid definition file in addition to the Inline and Crossline deltas for the position to be staked, you will see the Current bin, Current inline delta, and Current crossline delta. These values are based on your current position and are relative to the Grid definition file. You can use these values to offset the position to be staked and still be in terms of the Grid definition file.

The color of the current bin inline and crossline deltas is determined using the same logic as the target inline and crossline text colors except that the text turns green whenever the user is within the layout tolerance of the center of the current bin instead of the target point. This can be useful for offsetting to the center of a neighboring bin while in the field.

8. Use a combination of the arrow on the graphical view and the Inline\Crossline values to navigate to the point. The arrow automatically changes to a bull's-eye target as you move in closer.

#### Notes

- ◆ The arrow assumes that you are moving forward at all times.
- ◆ The bull's eye target does not assume that you are moving forward.

9. When the Inline and Crossline deltas are within tolerance, mark the position.

10. Once the point is marked, measure it as an as-staked point by tapping *Accept* or *Measure*.

If you try to measure a staked point within an exclusion zone, the following message appears, "Staked position is in exclusion zone", followed by the exclusion zones name. Tap *Cancel* to return to the navigation screen or tap *Continue* to measure the point anyway.

11. Once the point is stored, the increment value is used to determine the next point to stake:
  - ◆ If the next point using the increment value exists, you remain in the stake out graphics screen with the navigation details updated for the next point.
  - ◆ If the next point does not exist, tap *Cancel* to return to the stake out point screen where you can enter the name of the next point to stake. Alternatively, tap *Search* to find the next available point.

## Options

Access the Options dialog to:

- Specify an [Offset template file](#) or select an offset
- Configure a [Layout tolerance](#)
- Set [As-staked point details](#)
- Set [Display options](#)
- Configure [GNSS QC masks](#)
- Configure [other stakeout options](#)

## Offset template files

Offset template files are predefined lists of offset parameters, ordered on priority. When a template file is specified, a drop down list of offsets appears in the options menu. If you cannot stake the selected position, you can select an offsetted position from the list. If the offsetted position cannot be staked, you can work down the list until you find an offset position that can be staked. Offset template files (\*.TPL) are created in GPSeismic.

**Tip** - Offset templates can be used to offset points that fall within exclusion zones. When the message : "Point to be staked is in an exclusion zone" is displayed, tap *Continue*. Go into *Options* and select *Offsets*. Offsets that fall within the exclusion zone are prefixed with an "\*". Tap the *Best OS* soft key to select the first offset that is not in an exclusion zone. Tap *Accept* to stake out the offset point. If none of the positions in the current offset template fall outside of the exclusion zone then an error message will appear.

## Layout tolerance

The layout tolerance gives you a visual indicator that you are close enough to the stakeout point to make your measurement. When the layout tolerance is met, the Inline and Crossline deltas are colored green as a clear indicator that the point can be staked. When staking out using a grid definition file (\*.gdf), the layout tolerance will also be applied to the Inline and Crossline deltas for the current bin.

There are 3 layout tolerance modes, radial, inline, and crossline. These modes can be used independently or in combination. If used in combination, all enabled tolerances must be met in order to turn the indicator text green. Generally, we do not recommend using only an inline or crossline tolerance, but the radial tolerance can be used alone.

## Radial Tolerance

This radial tolerance is met when the horizontal distance to the design point is less than or equal to the specified tolerance. To enable the radial tolerance, select the *Use Radial Tolerance* option and then set the maximum acceptable distance between the design point and the stake location in the *Highlight deltas when distance is within* text box.

## Inline Tolerance

The inline tolerance allows you to specify a range in the inline direction only. Generally this is paired together with the crossline tolerance to cause the acceptable stakeout area to be a rectangle. Use of the inline tolerance by itself is not recommended. To use, enable the *Use Inline Tolerance* checkbox, then set the desired inline tolerance in the *Highlight deltas when Inline distance is within* .

## Crossline Tolerance

The crossline tolerance allows you to specify a range in the crossline direction only. Generally this is paired together with the inline tolerance to cause the acceptable stakeout area to be a rectangle. Use of the crossline tolerance by itself is not recommended. To use, enable the *Use Crossline Tolerance* checkbox, then set the desired inline tolerance in the *Highlight deltas when Crossline distance is within* .

## As Staked point details

You can configure the *View before storage* , *Horizontal tolerance* , *Staked deltas format* , *As-staked name* , *As-staked code* , and *Store grid deltas*.

## View before storage and Horizontal tolerance

To see the differences between the design point and the as-staked point before you store the point, select the *View before storage* check box and then choose one of these options:

- To see the differences every time, set the Horizontal tolerance to 0.000 m.
- To see the differences only if the tolerance is exceeded, set the Horizontal tolerance to an appropriate value that is greater than 0.000 m.

**Note** - The *Stake delta* values are reported as differences *from* the measured/as-staked point *to* the design point.

## User definable stakeout reports

The software supports user definable stakeout reports, which enable you to configure the display of staked information on the *Confirm staked deltas* screen that appears when you enable *View before storage*.

Formatting the staked deltas screen also supports the following settings:

- the size of the font for prompts
- the size of the font for reported values
- the color of the font for prompts

- the color of the font for reported values
- widescreen on or off

From the *Staked deltas format* field, select an appropriate display format.

**Note** - The Land Seismic Style Sheet (Land Seismic.sss) displays Inline and Crossline Stake deltas in terms of the Track Azimuth.

### As-staked name and As-staked code

You can set the **name** of the As-staked point to be one of the following:

- the *Design point name*
- the next *Auto point name*
- the *Current track and bin* (only available when the track azimuth *Reference method* is set to *Grid definition file*.)

**Note** - The current track and bin is in terms of the staked position relative to the grid definition file. If the position has been offset, the current track and bin could be different from the track and bin of the point being staked.

You can also set the **code** of the As-staked point to be one of the following:

- *Design name*
- *Design code*
- *Last code used*
- *Current track and bin* (only available when the track azimuth *Reference method* is set to *Grid definition file*.)

### Display

To configure the display:

1. Under *Display*, you can configure the *Display mode* to either *Target centered* or *Surveyor centered*.
2. Choose a setting in the *Display orientation* field. The options are:
  - ◆ *Direction of travel* - the screen will orientate so that the large navigation arrow points in the direction of travel.
  - ◆ *North* - the screen will orientate so that the north arrow points up the screen.
  - ◆ *Reference azimuth* - the screen will orientate so that the direction of the reference azimuth points up the screen.

**Note** -When using a TSC3 controller, the compass is ignored if the *Display orientation* is set to *North* or *Reference azimuth*.

3. Use the *Display perpendicular reference azimuth* check box to add 90 degrees (100 gons or 1600 mils) to the reference line displayed in stakeout. This option can be useful for manually offsetting points either side of the design point. Note that the reported Inline and Crossline values remain relative to the original reference azimuth.

**Note** - If you have the *Display orientation* set to *Reference azimuth* and *Display perpendicular reference azimuth* is checked, the screen will orientate so that the perpendicular reference azimuth, points up the screen.

4. If you are using a TSC3 controller, you can enable and disable the compass in the *Compass* check box under *Display*.
5. Use the *Display cut/fill* check box to specify whether or not you want the computed cut/fill to the point being staked displayed in the bottom right corner of the graphical stakeout display.

## **GNSS QC Masks**

The GNSS QC mask options warn the user before they store a point that does not meet the quality requirements of the current project. These can be configured to alert the user if the current point has a high PDOP or low satellite count before it is stored. If this option is enabled and one of the criteria is not met, a warning dialog will be presented to the user which will allow the user to restart the measurement or ignore the warning and continue to store the point. To configure GNSS QC Masks:

1. Check the *Apply GNSS QC Masks* to turn on the GNSS mask.
2. Set the *Warn if PDOP >* value to the maximum allowable PDOP. A measured PDOP value higher than this setting will trigger a warning.
3. Set the *Warn if # of Satellites <* value to the lowest number of acceptable satellites. A measured satellite count less than this setting will trigger a warning.

## **Automatically search for next or previous point**

If this option is cleared (not selected) and the point name auto increments to a non-existent point, a warning message will appear stating that the point name does not exist. Options available from this warning message are to go to the *Closest* point, *Search* the job for the next point. or *Cancel* back to Seismic point stakeout. If *Automatically search for next or previous point* is selected, no warning message will appear and the software will automatically search for the next point name in the job.

## **Warn if point has already been staked**

If *Warn if point has already been staked* is selected, it will display a warning if the current point has already been staked.

## **Display Halo Around Stakeout Point**

If this option is enabled, a yellow circular highlight is drawn around the point to be staked out in the Map screen for quick identification.

## **RTK & Infill Surveys**

Land Seismic supports Post Process infill surveys to enable you to keep surveying when RTK corrections from the base are lost. To use PP infill, you must use an RTK and Infill survey style.

To start infill:

1. From the main menu, select *Instrument / Start PP infill*.
2. Initialize and then continue as for a post processed kinematic survey.

**Note** - You must exit Seismic Stakeout before starting PP infill. However, once you have started PP infill, you can return to Seismic Stakeout.

When you start receiving RTK corrections again, select *Instrument / Stop PP infill* from the main menu and then continue with your RTK survey.