Introduction to TerraSync

TerraSync is loaded on to the Trimble TSCe and the Trimble GeoXT. The following is a brief tutorial of the basic functions of TerraSync provided by Trimble from the **TerraSync Operations Guide v 2.40**, and is also good for v 2.50.

TUTORIAL

This tutorial provides step-by-step instructions for some of the tasks that you will perform when using the TerraSync software.

The tutorial is divided into five parts: three relate to data collection, and two relate to real-time data update.

Data collection:

- Preparing for data collection
- Data collection
- Processing the data

Data update:

- Preparing for data update
- Data update

NOTE — You cannot update imported data files using the TerraSync Standard edition software. If you have TerraSync Standard edition installed, you cannot perform the data update part of the tutorial.

The tutorial helps you master the main concepts and tasks involved in using the TerraSync software. It is based on the following scenario:

The Seaview Authority maintains a GIS of its street signs, streets, and neighborhood parks for inventory purposes. Information needs to be collected about each entity, indicating its condition and other important information. You and your field crew are responsible for collecting new data and updating the existing GIS data for Starfish Bay.

- Data collection

  In this part of the tutorial you collect new features. First, you create a GPS Pathfinder Office project and prepare your equipment for data collection. Then you go to Starfish Bay where you record new features and their attributes. When you return to the office, you postprocess the data you collected, to achieve better positional accuracy for your results. Then you export the data to the Seaview Authority GIS.

- Data update

  In this part of the tutorial you update existing GIS data. Some time has passed since you collected the features, so you need to go back and update their attributes. Before going back to Starfish Bay, you import data from the Seaview Authority GIS into the GPS Pathfinder Office software, transfer it to your field computer, and prepare for data update. Finally you return to the field and navigate to existing features to update their attributes. You use the TerraSync software and a <Glossary>real-time differential GPS source to navigate back to features and update their attributes.

Preparing for data collection

Before going to Starfish Bay to collect data, you need to create a new project in the GPS Pathfinder Office software. Then you need to check your equipment to make sure that you are ready to go out into the field.

This section provides step-by-step instructions that will prepare you for data collection. The topics are:

- Creating a project
- The Seaview data dictionary
- Checking the equipment

Creating a project

The GPS Pathfinder Office software provides a set of tools for processing and managing GPS and GIS data. The GPS Pathfinder Office software lets you plan your data collection session easily and process the GPS data successfully.

Use the GPS Pathfinder Office software to organize work into projects. Dividing the work in this way helps you manage your files. You can give all projects meaningful names, and assign separate folders for base, export, and backup files. You can also set up projects for different groups of data. For example, you could create a project for each subdivision in the city, or for each month.

For this tutorial, you need to create a new project called TerraSync Tutorial.

To create a project in the GPS Pathfinder Office software:

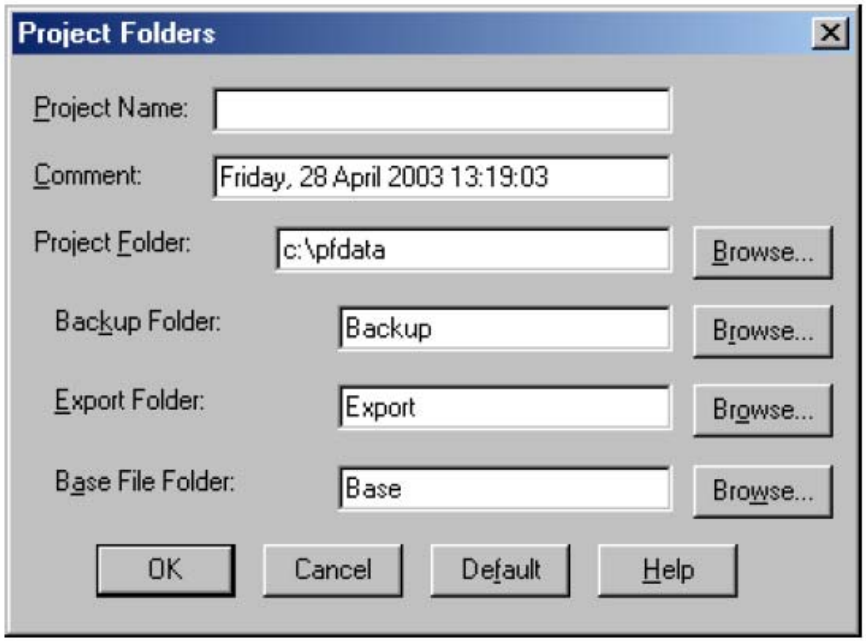
1. Click 

on the Windows taskbar, and then select Programs / GPS Pathfinder Office.

   A Trimble identification screen appears while the program is loading. This is followed by the GPS Pathfinder Office application window.

2. By default, the Select Project dialog appears. If it does not appear, from the File menu select Projects.

3. Click **New**. The Project Folders dialog appears:



4. In the Project Name field, enter **`TerraSync Tutorial`**, and then click **OK**.

   The Project Folder field is updated to show the default folder for the new project.
5. Click **OK** again to close this dialog and create the new project.
6. In the Select Project dialog, TerraSync Tutorial is selected in the Project Name field. Click **OK** to open the new project.

For more information, refer to the GPS Pathfinder Office Help.

The Seaview data dictionary

A data dictionary contains a description of the features and attributes relevant to a particular project or job. It is used in the field to control the collection of a feature and its attributes.

The signs, roads, and parks in Starfish Bay that you need to map are ***features***. The different types of information that you record for each type of feature are ***attributes***. For example, the condition of a sign, or the name of a park, would be an attribute.

To ensure that the data you collect in the field is in the correct format for the Seaview Authority GIS, you need to use a data dictionary that contains the same features and attributes as the Seaview Authority GIS. The Seaview.ddf data dictionary has already been created for this purpose. When you installed the TerraSync software on your field computer, this file was automatically installed.

Checking the equipment

Before going out into the field with the TerraSync software, check that you have all the necessary GPS hardware, batteries, and cables.

The TerraSync Release Notes provide cabling diagrams for the Trimble GPS receivers that the TerraSync software can connect to.

Before you leave the office, Trimble recommends that you:

- set up your entire GIS/GPS data collection system and test it to make sure that everything is connected correctly
- make sure that the receiver and field computer batteries are charged
- make sure that the field computer and GPS receiver are communicating correctly

CAUTION — After testing the system, turn off the field computer and any other equipment (such as radios) before proceeding to the start point of your field work. Leaving equipment on wastes battery life, especially if it will be some time before you need to use the equipment.

TIP — When you turn off the field computer, any receiver that is connected to it is automatically turned off.

Data collection

This part of the tutorial uses the Seaview data dictionary that is already installed on your field computer. You are ready to go to Starfish Bay and collect features. But first there are some tasks that you should complete. This section explains the tasks and gives the step-by-step instructions required to collect point, line, and area features, with a variety of different attributes. The topics are:

- Initial tasks
- Collecting new data

NOTE — To complete this part of the tutorial, you need to be outside, in a location where you can get good GPS signals. Some TerraSync screens may appear different from the screens shown in this tutorial.

Initial tasks

Before starting a data collection session, you need to perform certain tasks. They are:

- Starting the TerraSync software
- Getting a clear view of the sky
- Checking the GPS status
- Configuring the GPS slider bar

Starting the TerraSync software

When you get outside, switch on the field computer and start the TerraSync software. The GPS receiver should start automatically when you start TerraSync.

Tap Start and then select Programs / TerraSync. While the software is loading, a Trimble identification screen appears.

The Skyplot screen in the Status section appears after the identification screen.

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Getting a clear view of the sky

Move to a location where you have a clear view of the sky.

Signals can be received from any direction. Satellite signals can be blocked by people, buildings, heavy tree cover, large vehicles, or powerful transmitters. Anything that blocks light also blocks signals. GPS signals can go through leaves, plastic, and glass, but these all weaken the signal.

Checking the GPS status

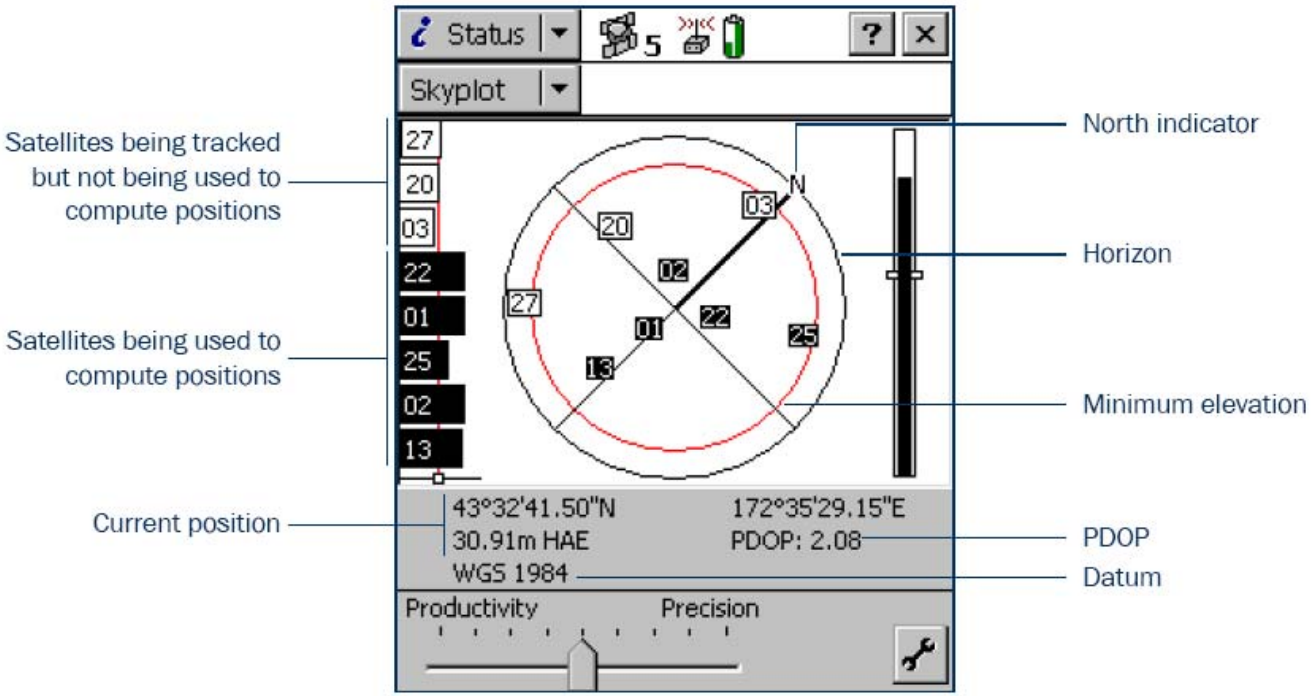
When you start the TerraSync software, it automatically connects to the GPS receiver. TerraSync then begins to track visible satellites and to calculate its current position. Use the satellite icon on the Status bar to check whether the receiver is computing GPS positions. This icon provides information about the geometry of the satellites that are being used to compute GPS positions.

Use the Status section to view the satellites currently tracked and those that are being used to calculate the current position.

NOTE — For more information about satellite geometry and how this can affect GPS data collection, visit the Trimble website at www.trimble.com.

To view the GPS status:

1. The Skyplot appears when you first run the TerraSync software. If this screen is not visible, tap the Section list button and select Status. Then tap the Subsection list button and select Skyplot.



2. Use the skyplot to see which satellites are being tracked, and to see your current position.

Filled (black) boxes represent satellites that the receiver is using to compute its current GPS position. Unfilled (white) boxes represent satellites that the receiver is getting signals from but is not using because the signals are too weak. In the above example, eight satellites are being tracked and five of these satellites are being used to compute GPS positions.

NOTE — Numbers with no box represent satellites that are available, but that the TerraSync software is not receiving signals from.

Your current GPS position is displayed at the bottom of the screen.

TIP — For detailed information on satellite positions and signal strengths, use the Satellite information screen in the Status section.

You need a minimum of four satellites, with good geometry, to compute a 3D GPS position. When you turn on the receiver, it automatically starts to track visible satellites and to calculate its current position. If the receiver is computing GPS positions, the satellite icon in the Status bar and the number beside the icon are solid. If the satellite or its number are flashing, the satellite geometry is poor or there are too few satellites available to compute GPS positions. Adjust the GPS slider or wait until conditions are more favorable.

Configuring the GPS slider bar

There are some critical settings in the TerraSync software that you must configure before collecting data (for example, the GPS settings). Configure these before leaving the office, or in the field. You can also set other (non-critical) settings to suit your application or preferences.

The following steps show you how to configure the GPS slider bar to best suit the environment of Starfish Bay. Starfish Bay is an open area, with few tall buildings, trees, or other obstructions. Therefore, you need to adjust the GPS slider bar to allow better positions to be recorded. You will record fewer positions because you will restrict logging to locations when there is good satellite geometry, but the positions you record will have higher quality.

NOTE — By default, the GPS slider bar is set at the middle setting. When you adjust the GPS slider bar to the left, you can obtain positions in less favorable conditions that are less precise.

To configure the GPS slider bar:

1. Tap the Section list button, and then select Setup.
2. Tap **GPS Settings**. The GPS Settings form appears.

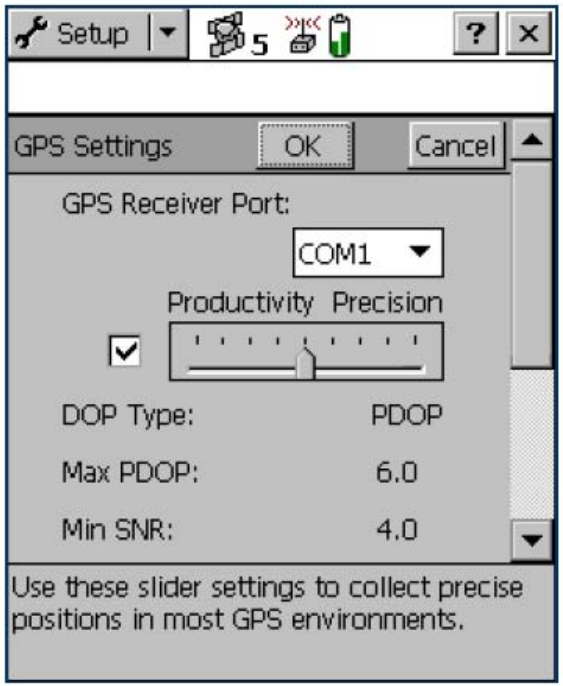
TIP – Use a high setting on the GPS slider bar whenever a project requires the highest level of precision.

3. Drag the slider control to the right to raise the GPS slider bar two positions.

   This lets you collect fewer positions, but they will be more precise. Because there are few obstacles to block your view of the sky, this may provide better overall results. If the slider bar is set too high, the precision of the positions collected is high, but there may be places in the Starfish Bay area that cannot be mapped.

4. Tap **OK** to close the GPS Settings form.

For more information, see GPS Settings.



Collecting new data

Your supervisor has sent you to Starfish Bay to map new road signs, roads, and parks. This part of the tutorial gives step-by-step instructions for the following tasks:

- Creating a new data file
- Collecting a point feature
- Collecting a line feature with Log Later
- Collecting an area feature
- Ending the data collection session

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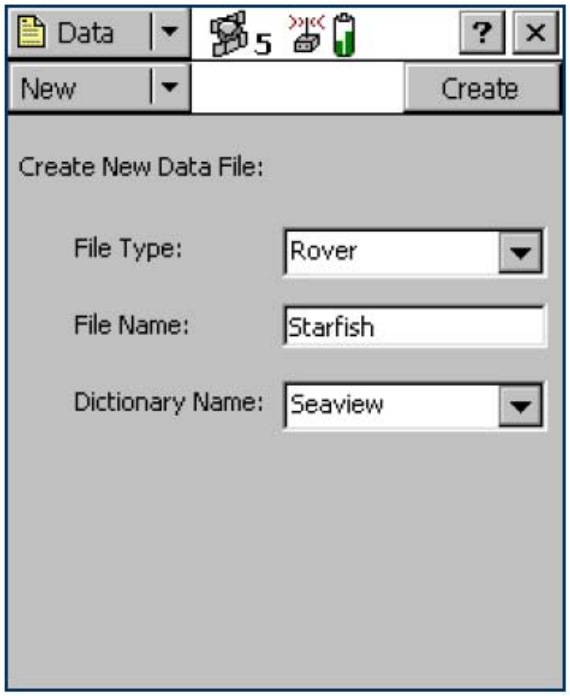
Creating a new data file

Before starting the data collection session, you need to create a new data file to store the new features and attributes you collect. Use the Data section to do this.

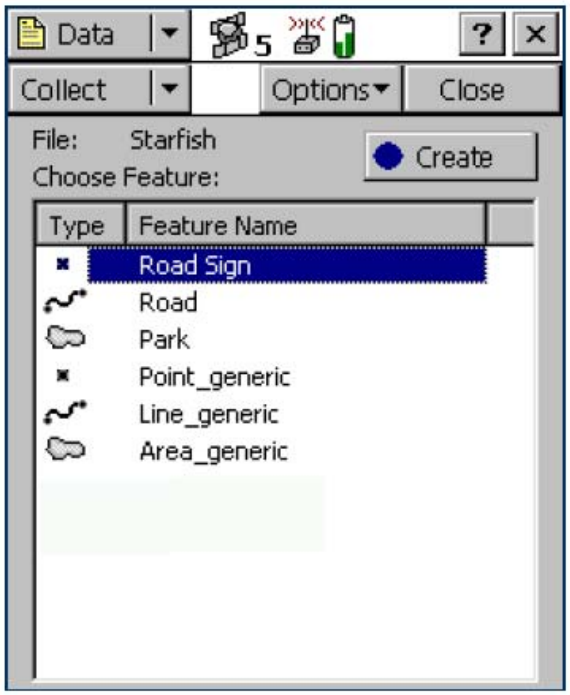
To create a new file:

1. Tap the Section list button, and then select Data.
2. Tap the Subsection list button, and then select New File. The New File screen appears.
3. The TerraSync software automatically enters a default name in the File Name field. Replace the default name with **`Starfish`**.
4. In the Dictionary Name field, make sure that the Seaview data dictionary is selected.
5. Tap **Create**.



6. The Confirm Antenna Height form appears. If necessary, enter the correct antenna height and measurement point, and then tap **OK**.
7. The Collect Features screen appears. This screen shows a list of all the features in the data dictionary.

You have created a new data file, so you can now start collecting features.



Collecting a point feature

The first new feature you need to record is a road sign. This is a point feature.

To record a point feature, you remain stationary while the TerraSync software logs GPS positions. These positions are averaged to compute the final GPS position of the point feature.

When the TerraSync software is logging GPS positions, the logging icon appears in the status bar. The number beside the icon indicates how many positions have been logged for the selected feature.

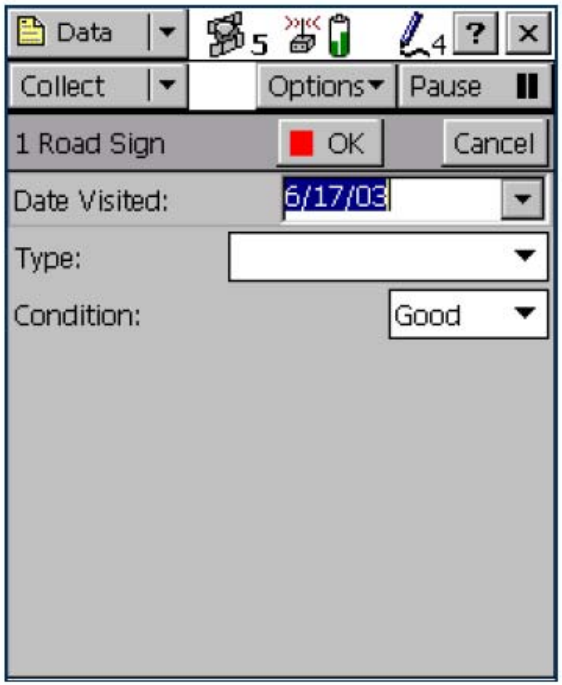
To record a point feature:

1. Make sure that the Collect Features screen is open. If it is not, tap the Section list button, select Data, and then tap the Subsection list button and select Collect Features.
2. In the Choose Feature list, highlight Road Sign, and then tap **Create**. The attribute entry form for the Road Sign feature type appears.

   The Date Visited attribute is set to auto-generate on creation, so today's date is automatically filled in. You do not need to enter a value in this field.
3. From the list of options in the Type field, select Stop. These options are the values defined in the data dictionary.

   This is a new sign, so its condition is good. Good is selected by default in the Condition field, so you do not need to change this field.

   You have now recorded all the attribute information needed for the road sign.



4. As the software logs GPS positions, the counter beside the logging icon increments. When you have finished entering the attributes, tap **OK** to close the road sign feature.

   The attribute entry form closes and you are returned to the Collect Features screen.
5. Later in the tutorial, you will navigate back to a sign that needs to be replaced, and update its attributes. You need to collect this road sign feature now. Repeat the above procedure to log another road sign feature. When you get to step 4, change the Condition field to Replace.

Collecting a line feature with Log Later

The next feature you need to record is a road. This is a line feature. To record a line feature, you need to travel along the line. As you do so, the TerraSync software will record a GPS position at the configured logging interval, which defaults to the value that was set when the feature was created in the data dictionary. These positions are joined together to form a line.

By default, the TerraSync software begins logging GPS positions as soon as you open a new feature. You can use the Log Later option to delay logging of positions until you have entered the attributes for the feature, or until you reach the start of the feature.

To record a line feature with the Log Later option:

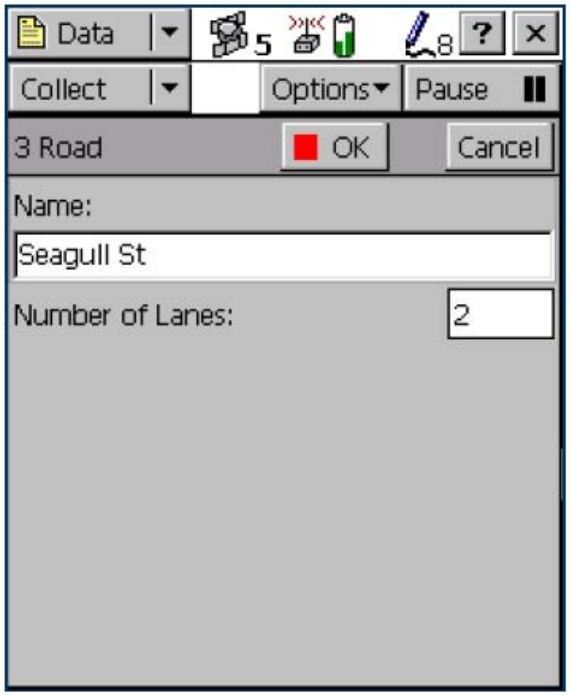
1. Make sure that the Collect Features screen is open. If it is not, tap the Section list button and select Data, and then tap the Subsection list button and select Collect Features.
2. In the Choose Feature list, highlight Road.
3. Tap **Options** and select Log Later.
4. Tap **Create**. The Road attribute entry form appears.

   You can record the attributes of the road before logging GPS positions.

NOTE — When you use the Log Later option, the pause icon ▮▮ flashes in the status bar to let you know that the TerraSync software is not logging GPS positions.

5. The Name field is already highlighted. Enter the name of the road, which is **Seagull St**.
6. Seagull Street has two traffic lanes. In the Number of Lanes field, enter the value **2**.
7. Move to the start of the road and tap **Log** to begin logging GPS positions for the road feature. The pause icon disappears from the status bar and the number on the logging icon increments as each position is recorded.
8. Continue down the road. When you reach the end of the line you are logging, tap **OK** to close the road feature.

NOTE — The Log Now and Log Later functions apply to all features you collect.



Collecting an area feature

Now you need to record the park in Starfish Bay. This is an area feature.

To record an area feature, you need to travel around the perimeter of the area. As you do so, the TerraSync software will log GPS positions at the logging interval set in the data dictionary. These positions are joined together to form the perimeter of the area.

The first and last GPS positions are joined together to close the area, so there is no need to return to the exact start point.

When you logged the road feature, you recorded the attributes before you started to log GPS positions. For the park feature, you will log GPS positions at the same time as you record the attributes.

To collect an area feature:

1. Make sure that the Collect Features screen is open. If it is not, tap the Section list button and select Data. Then tap the Subsection list button and select Collect Features.
2. Tap **Options** and select Log Now.
3. In the Choose Feature list, highlight Park.

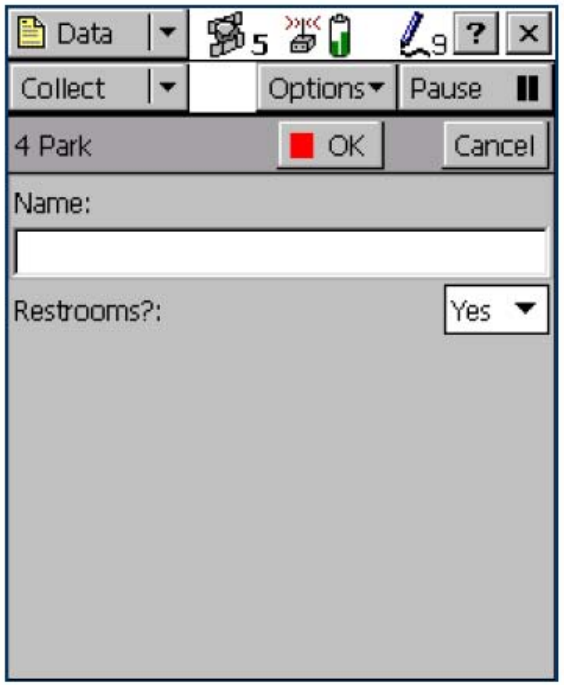
4. Tap **Create**.

   The attribute entry form for the Park feature opens, and the TerraSync software starts to log positions.

   You can pause logging at any time. For example, if you are driving around the perimeter of the park and you want to stop and examine a sign some distance from the park, you can stop logging positions for the park boundary. You can also pause logging if you want some time to enter attribute values.

5. To pause logging, tap **Pause**. The TerraSync software stops logging positions and a pause icon flashes in the status bar. To continue collecting the park feature, tap **Resume** to resume logging. The pause icon disappears.

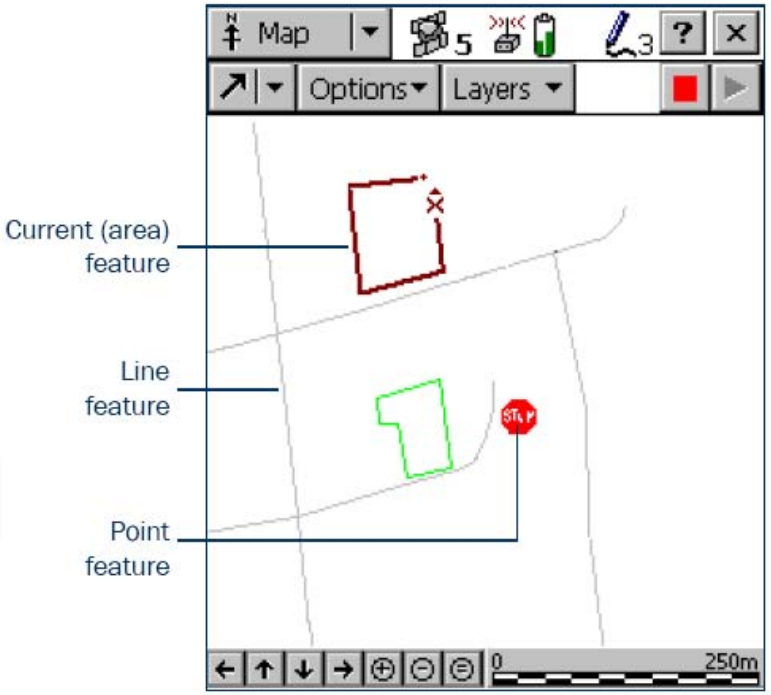
   For more information, see Pausing and resuming logging.



6. You can view the map while collecting features. To do this, tap the Section list button and select Map. The features that you have collected are displayed on the map, along with the park perimeter that you are currently collecting.

   You can view the map at different scales. To do this, tap the Zoom In or Zoom Out button on the Command bar.

   Alternatively, tap the Map Tools list button, select Zoom In or Zoom Out, and then select the point on the map that you want to zoom in or out from.



NOTE — Your Map screen may appear different from the one shown.

7. Tap the Section list button and select Data to go back to the Data section. The Park attribute entry form is still active and the TerraSync software is still logging positions for the park.
8. Enter the park's attributes. In the Name field, enter **`Starfish Park`**, and from the Restrooms? field, select Yes.
9. When you have walked around the perimeter of the area, tap **OK** to close the feature.

TIP — There are several advanced techniques that make data collection more efficient. For more information, see Advanced data collection.

Ending the data collection session

When the data collection session is complete, close the data file and exit the TerraSync software.

To close the open data file and exit the TerraSync software:

1. Tap **Close** in the Collect Features screen.

   A message appears, asking you to confirm that you want to close the open file.
2. Tap **Yes** to close the current data file and return to the New File screen.
3. Tap the Close button  in the upper right corner of the screen.

   A message appears, asking you to confirm that you want to exit the TerraSync software.
4. Tap **Yes** to exit the TerraSync software.