Functionality of CarryMap application

for Android devices

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About the app

CarryMap is a fully functional map application for viewing and working with mobile maps on smartphones and tablets regardless of Internet connection.

System requirements:
Android 6.0+

Supported smartwatch types:
Wear OS*

Supported data formats:
CMF2, MBTILES**, GPKG (GeoPackage), KML/KMZ, GPX, SHP

Supported types of online mapping services:
ArcGIS Service, Web Map Service (WMS)

*You can control certain app functions on your primary device and view information about your movement parameters and current location on your smartwatch.
**Maps in MBTILES format with raster tile type only are supported.

Application terminology

Mobile interactive map is a digital map of the area provided to view and work with it on mobile devices. The data transfer in mobile map is carried out in a two-way mode for the user. Such maps contain open information visible right after the map is open, and closed information which appears upon the user's actions only. The mobile application CarryMap is provided for working with mobile interactive maps in CMF2 format. This format allows you to quickly draw a map on a mobile device, provides effective data compression (created maps are more compact) and has some other advantages.

Maps catalog is a storage of mobile interactive maps in CMF2 format available for download with Internet connection. It stores different thematic maps as well as maps of world regions based on OpenStreetMap data.

Project is a set of maps and data layers with specified parameters. A project can consist of an unlimited number of maps or data layers.

Coordinate system of the map and project is a set of definitions that implements the coordinate method, that is, a way to determine position and movement of a point or a body using numbers or other symbols. Coordinate systems also known as cartographic projections are random designations of spatial features. There are two types of coordinate systems, the geographic and projected coordinate system. The coordinate system of the mobile map in CMF2 format is set during the map's creation, while the coordinate system of the project is determined based on the coordinate system of the project's lower layer.

Map scale is the proportion of the segment length on the map to its actual length on the area. Map scale at each point has its own particular value depending on the latitude and longitude of this point.

Map extent is a selected area on the map. Map extent captures spatial data at a particular scale.

Bookmark is a saved extent of the map. Bookmarks are useful while working with big spatial data, as you can quickly refer to the needed extent.

Spatial feature is a feature that stores its geographic representation as point, line or polygon as one of its properties (fields) in a line. A feature as an entity has coordinates, name, belonging to a data layer and can have description, media attachment.

Feature coordinates are a set of numbers that determine position of feature on a line, plane, surface or in space. CarryMap allows you to work with the following coordinates representation formats:

- Degrees-minutes-seconds (DMS). Coordinates are displayed and set when searching and creating a feature in the form 00°00'00" N/S 00°00'00" E/W (latitude and longitude);
- Decimal degrees (DD). Coordinates are displayed and set when searching and creating a feature in the form X 00,00000 Y 00,00000 (latitude and longitude);
- UTM meters. Coordinates are displayed and set when searching and creating a feature in the form X 000000,00 Y 000000,00 (latitude and longitude).

Attachment is a multimedia file (photo, video, audio, document) added to any type of feature (point, line, polygon). Types of media attachment supported in the mobile app CarryMap are jpeg, png, doc, pdf, txt, mp3, avi and etc.

Identification card is information about a feature that appears while selecting a feature on the map. An identification card contains attribute information about a feature and attachments as photo or media files, if any.

Track is a sequence of GPS coordinate points with timestamps. In the mobile app CarryMap you can record GPS tracks and show the current route on the mobile map.

Section 1. Getting started and configuring the app

Application permissions

In order for the app to work correctly, the application requires access to use certain functions and data of your device. When each of the permissions is requested, a corresponding notification is issued. The content of requests and the ways to grant access to permissions may vary depending on the device model and OS version.

Recommended list of permissions:

- *Memory* – the application requires access to photos, multimedia and files on the device for correct operation. If there is no access to data, the application will not be able to read maps and data on the device, as well as work correctly when adding attachments to objects.
- *Location* – access to the approximate and exact location of the device is required for the correct operation of the application. We recommend giving the application access to the exact location of the device (by network coordinates and GPS satellites). For the track recording function to work correctly and create polygons by tracks, we also recommend that you grant the app access to your location in any mode (including in the background), otherwise the app will not be able to receive data about your location in the background, and the track line will be built incorrectly.
- *Camera* – for the application to work correctly when adding photos and video attachments to objects, the application needs access to the device's camera.
- *Microphone* – for correct work of the app when recording audio and video attachments, the application needs access to the microphone, otherwise audio recording will not be performed.

Configuring the system settings

Some default settings of Android devices restrict applications' access to certain system functionality when running in the background mode. These restrictions lead to incorrect operation of the main functions of CarryMap app, such as determining the current location and track recording, creating polygon by track, and using the feature or place on the map as destination. To solve this issue, you need to change the system settings of your smartphone or tablet, which are responsible for optimizing battery consumption and regulating access to location data. Without these changes, CarryMap application will not be able to receive your location data in the background and the above functions will work incorrectly.

Changing battery saving settings

1. Go to the ***Settings*** section on your device*.
2. Tap ***Apps***.
3. Select ***Show All Apps***.
4. Select ***CarryMap*** application.
5. Tap ***Battery***.
6. In the ***Manage battery usage*** section, select ***Optimize battery usage***.
7. Select ***All applications***.
8. Select ***CarryMap*** application.
9. Turn off background battery usage restriction or select.

Changing location access settings

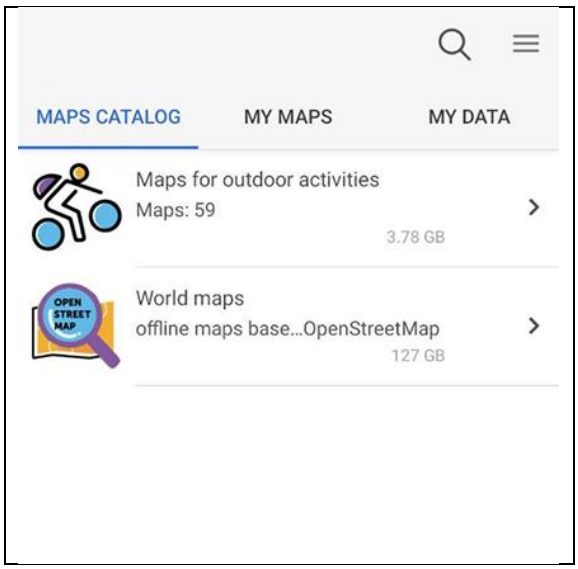
1. Go to the ***Settings*** section on your device*.
2. Tap ***Apps***.
3. Select ***Show All Apps***.
4. Select ***CarryMap*** application.
5. Tap ***Permissions***.
6. Select ***Location***.
7. Change location access to ***Allow in any mode*** or ***Always***.

* NOTE: The way to navigate to the Settings section and the settings names may differ depending on the model and OS version of your device.

Maps catalog

The start page of the CarryMap application consists of three sections: the *Maps Catalog, My Maps* and *My Data*.

The ***Maps catalog*** tab contains free maps in the CMF2 format of various thematic focus, available for download if there is an Internet connection.



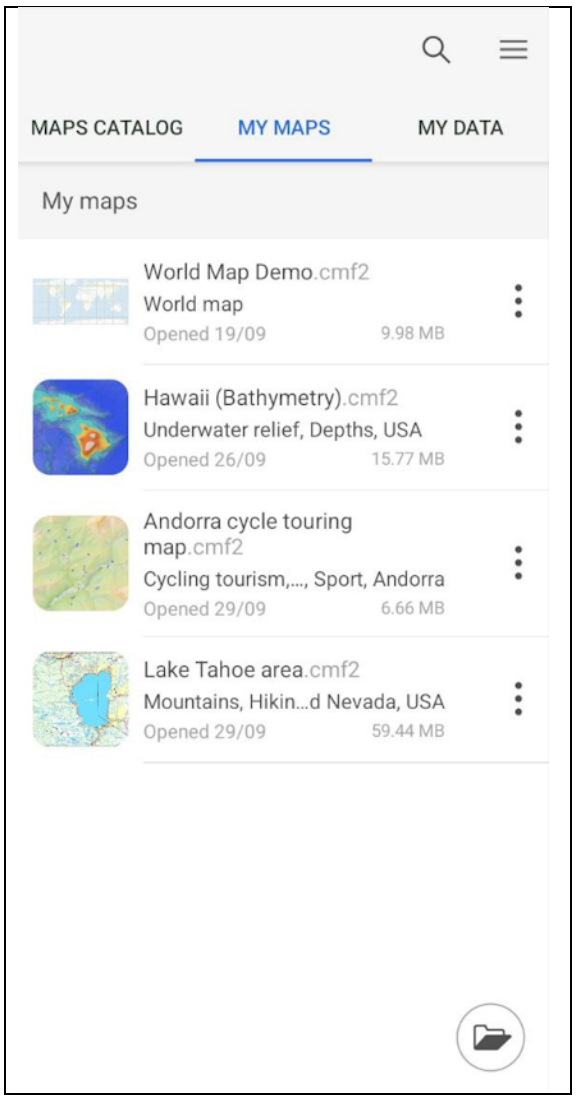
To download a map from *Maps catalog*, select it from the list and tap *Download* . The download process will start.

To cancel the process, tap *Cancel* .

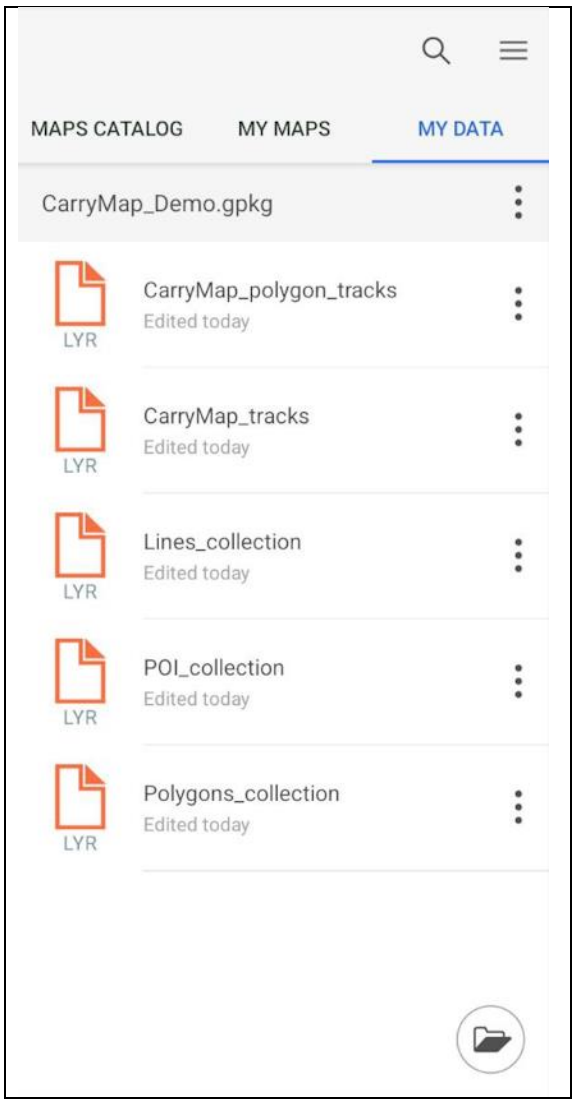
If the map has available updates, you will see the icon near this map name. Tap this icon to download the updated version of the map.

NOTE: Downloading maps, might be charged for using Internet traffic due to your provider tariff.

The *My Maps* tab displays all maps in the CMF2 and MBTILES formats downloaded and added by the user and stored on the device in the applications folder, as well as projects created from the application data (see *Creating and opening project*). Access to the data in the *My Maps* section does not require an Internet connection.

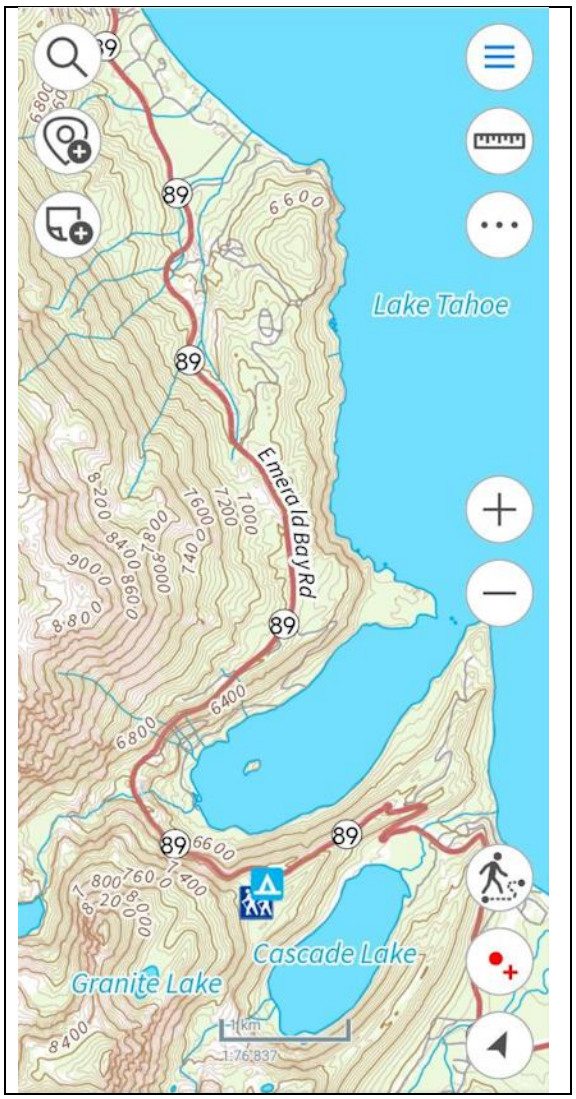


The *My data* tab displays data in GeoPackage, KML/KMZ, GPX, SHP formats stored on the device in the application folder. Access to the data in the *My data* section does not require an Internet connection.



Map window

When selecting a map or a project (see *Creating and opening project*) in one of the sections of the start page of the application, you automatically get to the *Map window*.



In the map window, you can work with the map and project data – adding additional layers, creating new features, determining location, recording tracks, searching for features, measuring distances and areas, etc.

Overview of the map window buttons:

Main menu – provides options to make settings of the app without leaving the current project, to add layers and maps to project, to manage layers visibility and to perform operations with layers (zoom in/out, delete, view legend, view layer properties, etc.).

Search on map, go to coordinates – performs text and numeric search, goes to coordinates in DD and DMS formats.

Measure – measures on the map.

Create object – creates objects on the map (points, polylines, polygons).

Marks on map – creates graphic marks on the map.

Record track – records and saves GPS tracks.

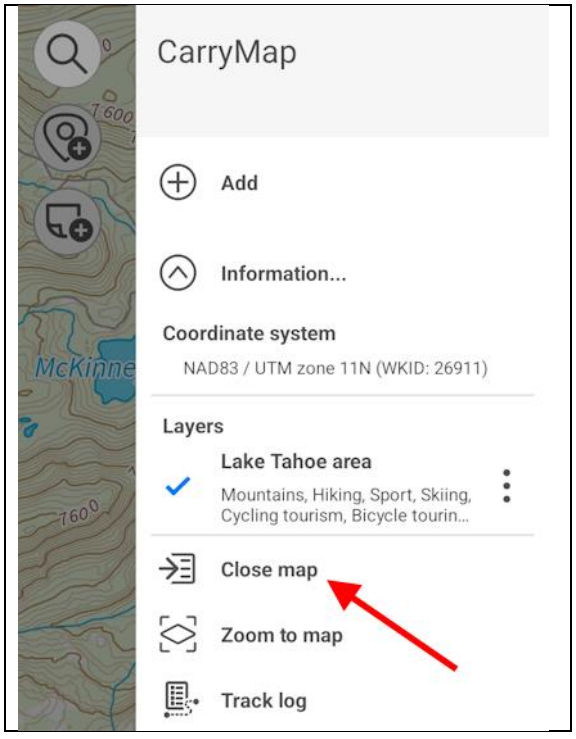
Save a point – creates point with a single tap.

My location – defines current location of the user.

Additional tools for work with map – saving map extent as bookmark or PDF document.

Change map scale – zooms in/out the map.

To exit the map window and go to the Map Catalog window, click *Close Map* button in the Main Menu.



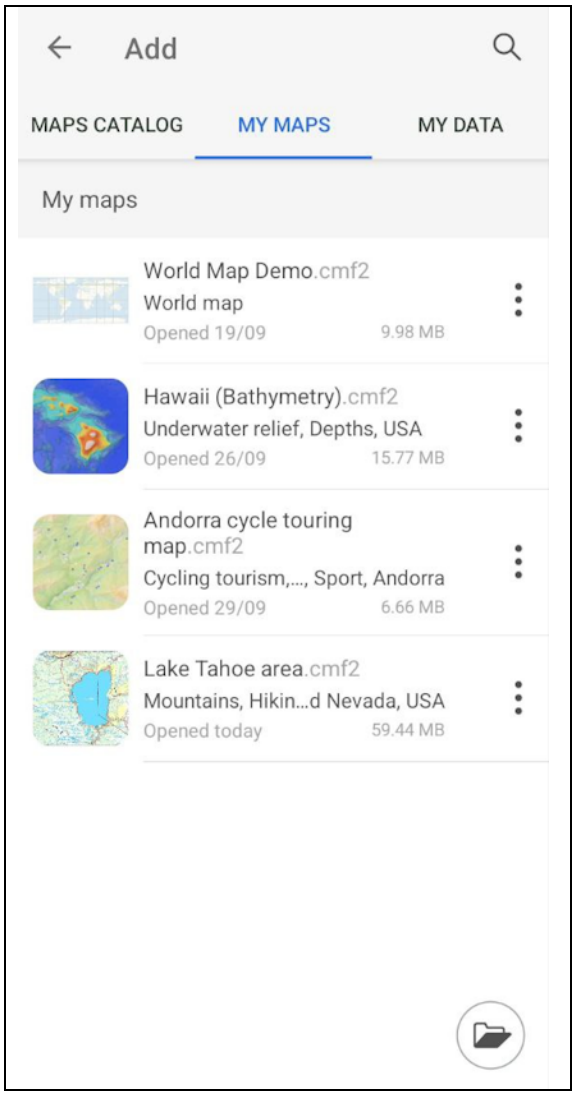
Page of adding data and maps

CarryMap allows you to open maps in CMF2 or MBTILES formats and projects based on them directly from the start page sections of the application. Data from other supported formats and online mapping services can be added to an open map or project as additional layers.

All data that can be added to a map or project is presented on the Page for adding data and map layers. To go to the page, click Add in the main menu of the Map window (see *Adding maps and data to project*).

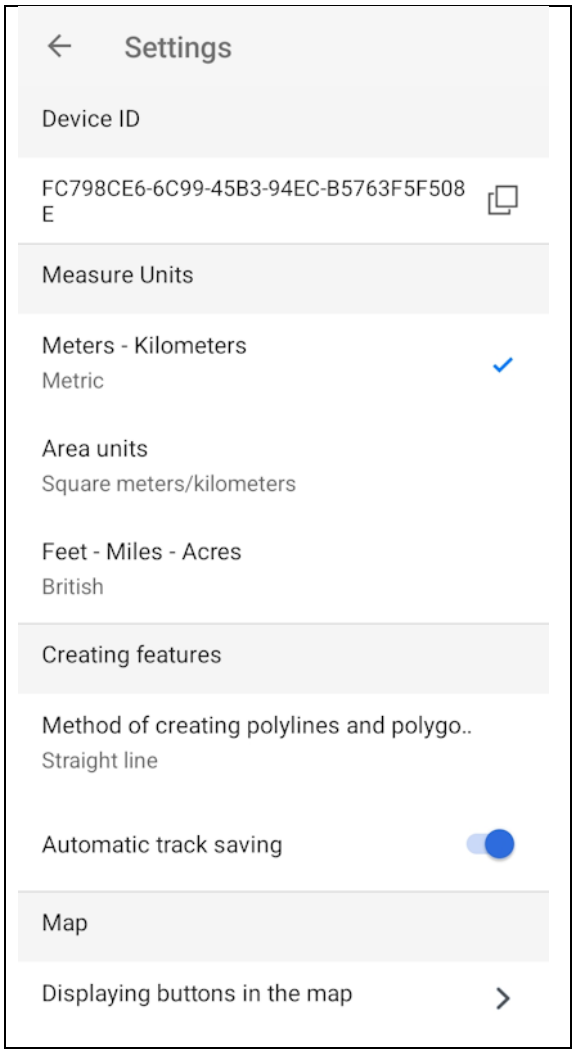
The page for adding data and map layers consists of three sections:

- *Map Catalog* – maps are displayed in the format .CMF2, available for download, as well as online mapping services;
- *My Maps* – displays all maps in CMF2 and MBTILES formats downloaded and added by the user and stored in the application folder on your device;
- *My data* – displays data in GeoPackage, KML/KMZ, GPX, SHP formats stored on the device in the application folder.



Application settings

You can access the application *Settings* from the menu on the start page of the application or from the main menu in the map window.



In this window, you can change the general settings of the application and find out information about the device ID:

Device ID – viewing and copying information about the device ID, based on which the availability of cards limited by the device ID is determined (see *Opening map*).

Measurement units – changing the measurement system:

- Metric system (meters, kilometers):
  - Area units:
    - Square meters/kilometers
    - Hectares.

- British system (feet, miles, acres).

Creating features – settings for features creation in the application:

- Changing the method of creating polyline and polygon features:
  - Straight line
  - Freehand line.
- Enable/disable *automatic track saving* after stopping recording. The changes are applied to the Record track and Create polygon by track tools.

Map – changing the display of elements in the map window and working with map layers:

- Displaying buttons in the map:
  - Hide or show buttons to change the map scale
  - Hide or show the *Create mark butto*n in the map window
  - Hide or show the *Save point butto*n in the map window
  - Hide or show the *Record track butto*n in the map window
  - Hide or show the *Create polygon by track butto*n in the map window.
- Hide or show the scale bar in the map.
- Hide or show the circular ruler in the map.
- Enable or disable screen lock while working with the application.
- Enable/disable cascade layer visibility toggling for CMF2 maps.
- Enable/disable the display of a buffer showing the accuracy of location on the map.
- Enable/disable the display of information from your device's GPS/GLONASS receiver at your current location on the map.

Cache – data caching settings in the application:

- Maximum cache size - select the required cache size from the list.
- Clear the cache.

Icons – change the appearance of the icon display on the map of the pushpin and location:

- Pushpin - open the list and select the desired icon.
- My Location - open the list and select the appropriate icon.

Coordinate systems – selection of the design coordinate system with indication of UTM zones (WGS-84, NAD-83).

Section 2. Application data

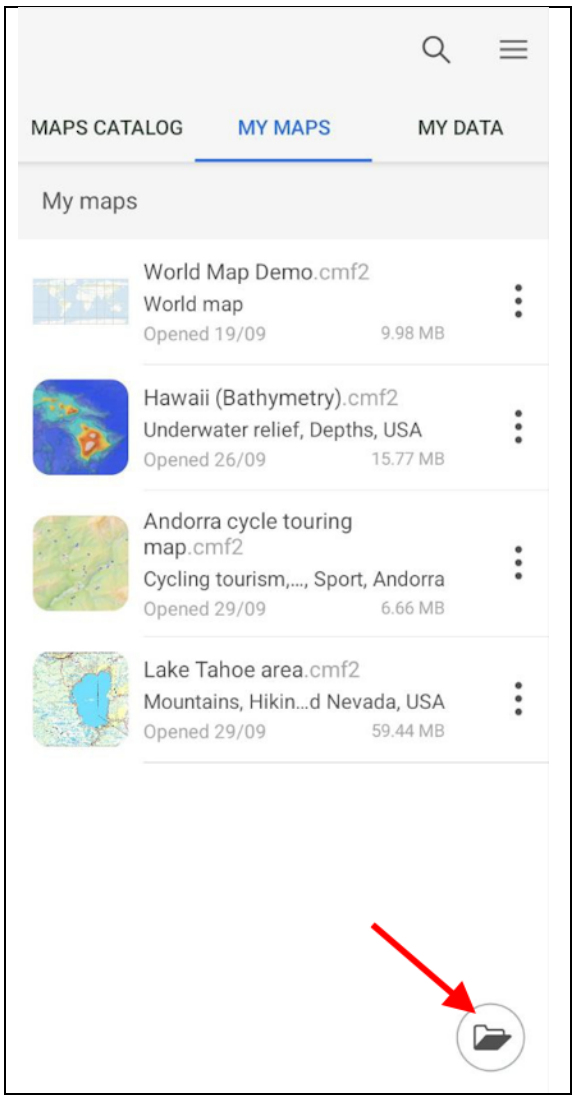
Adding maps and data to the application folder

The CarryMap mobile application works directly with maps and data stored in the application folder. The location of the application folder depends on the Android version of your device. For devices with Android version 10 and below, the CarryMap folder is located in the internal storage of the device, and for devices with Android version 11 and above – in the application system folder (Android/data/com.dataeast.carrymap/files/CarryMap).

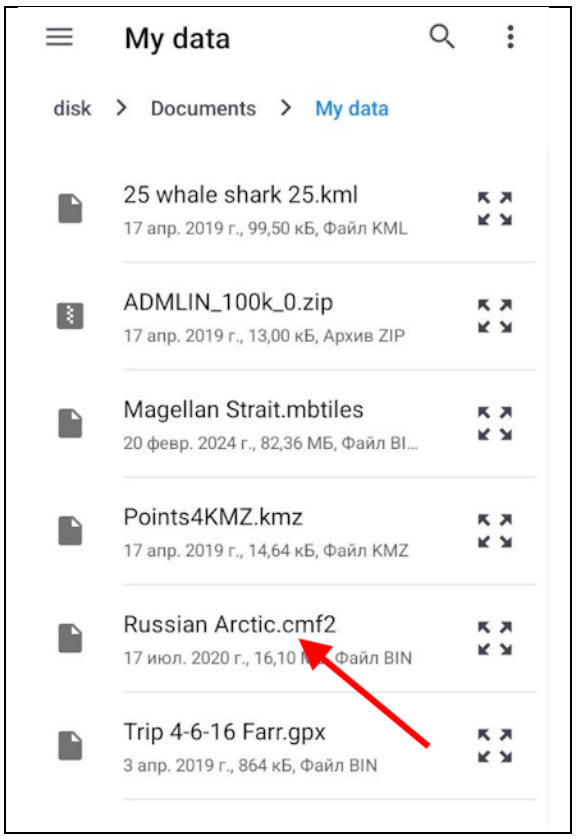
To add a project, CMF2 or MBTILES mobile map or data layers from GeoPackage, KML/KMZ, GPX, SHP files to the application folder, use the built-in access to data stored in your device's memory, transfer information from your PC to your mobile device, use the standard file manager tools of your device, import data from the cloud storage (OneDrive, Google Drive, Dropbox, etc.), send data via email or messengers.

Adding maps and data from the device's storage

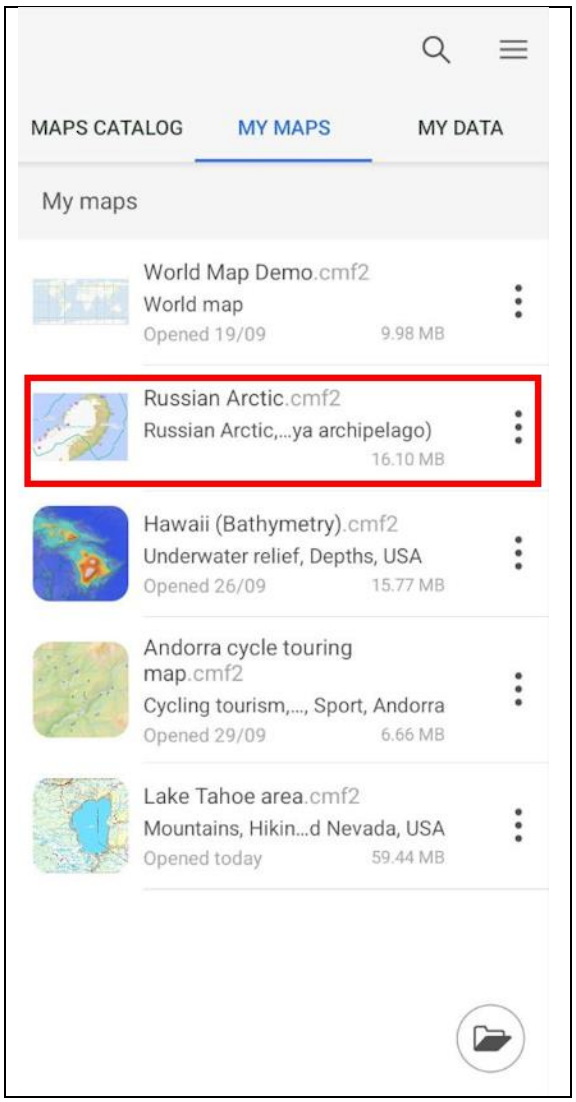
Tap the button with the folder icon in *My maps* or *My data* tabs in the CarryMap application.



Navigate to the data folder. Select the file to add to the CarryMap application.

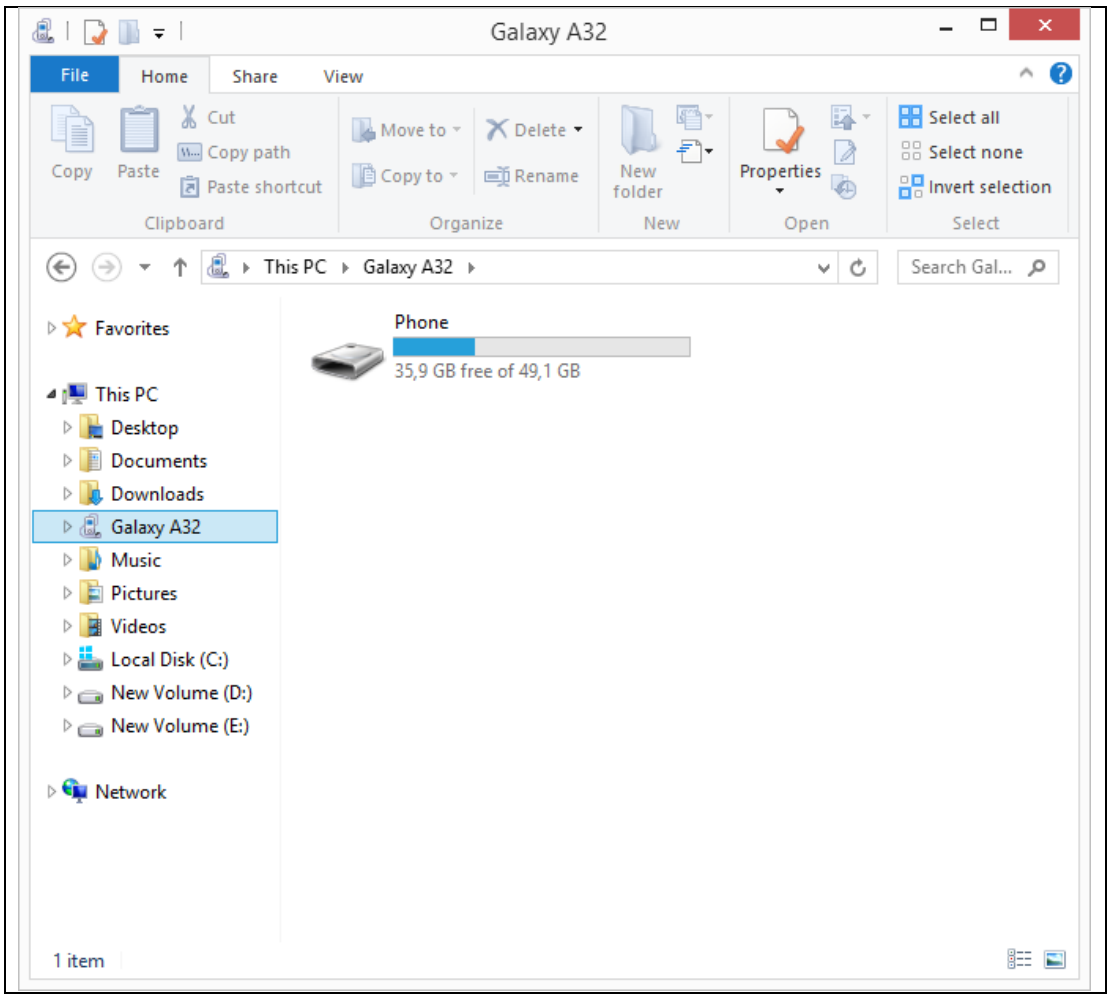


The data will be added to the library of the CarryMap application.

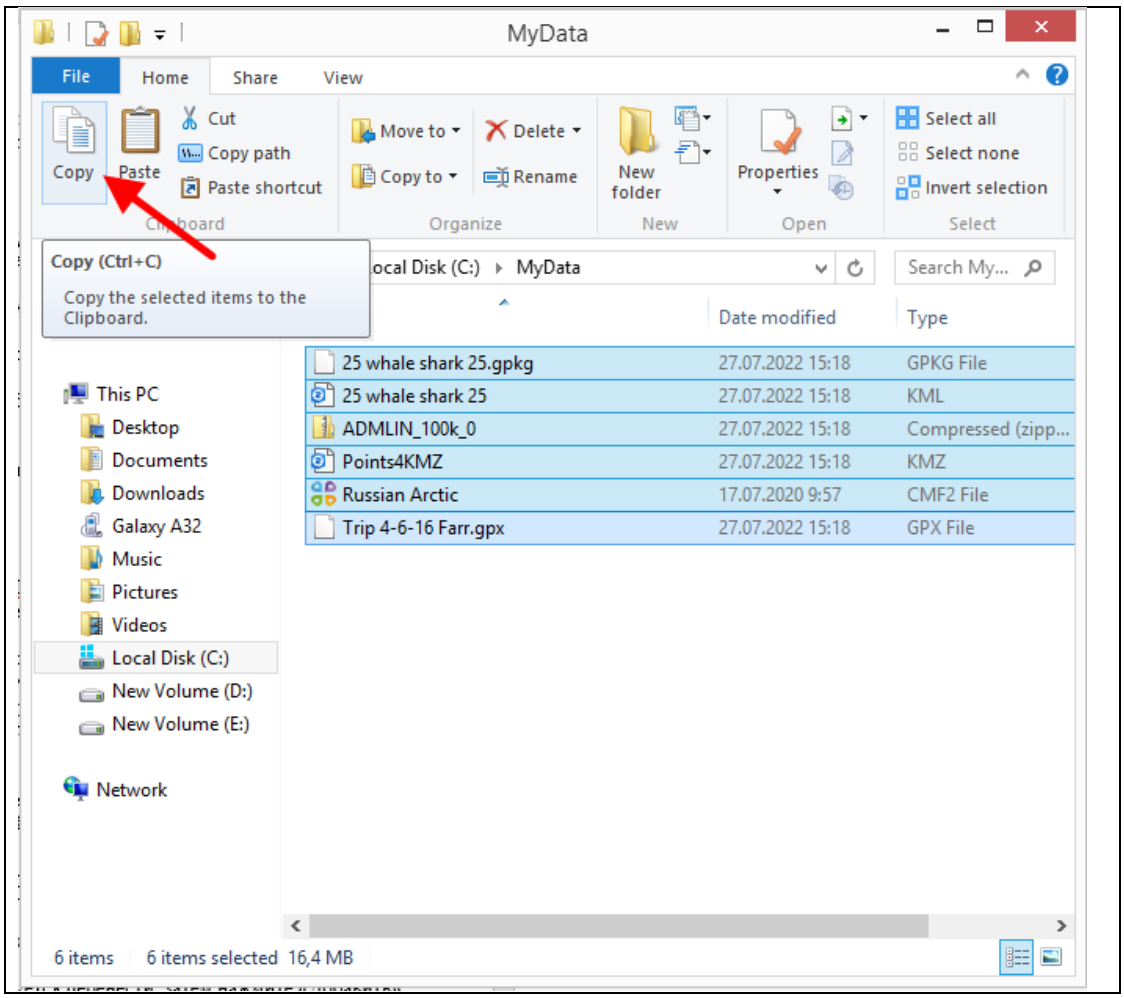


Transferring information from a PC to your mobile device

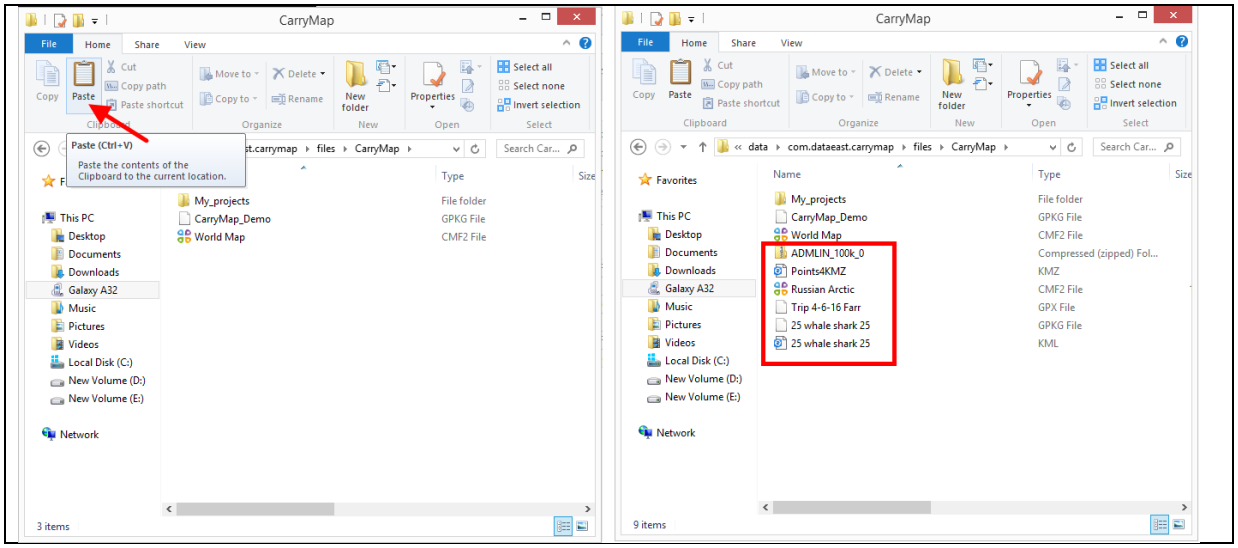
Connect your mobile device to your PC.



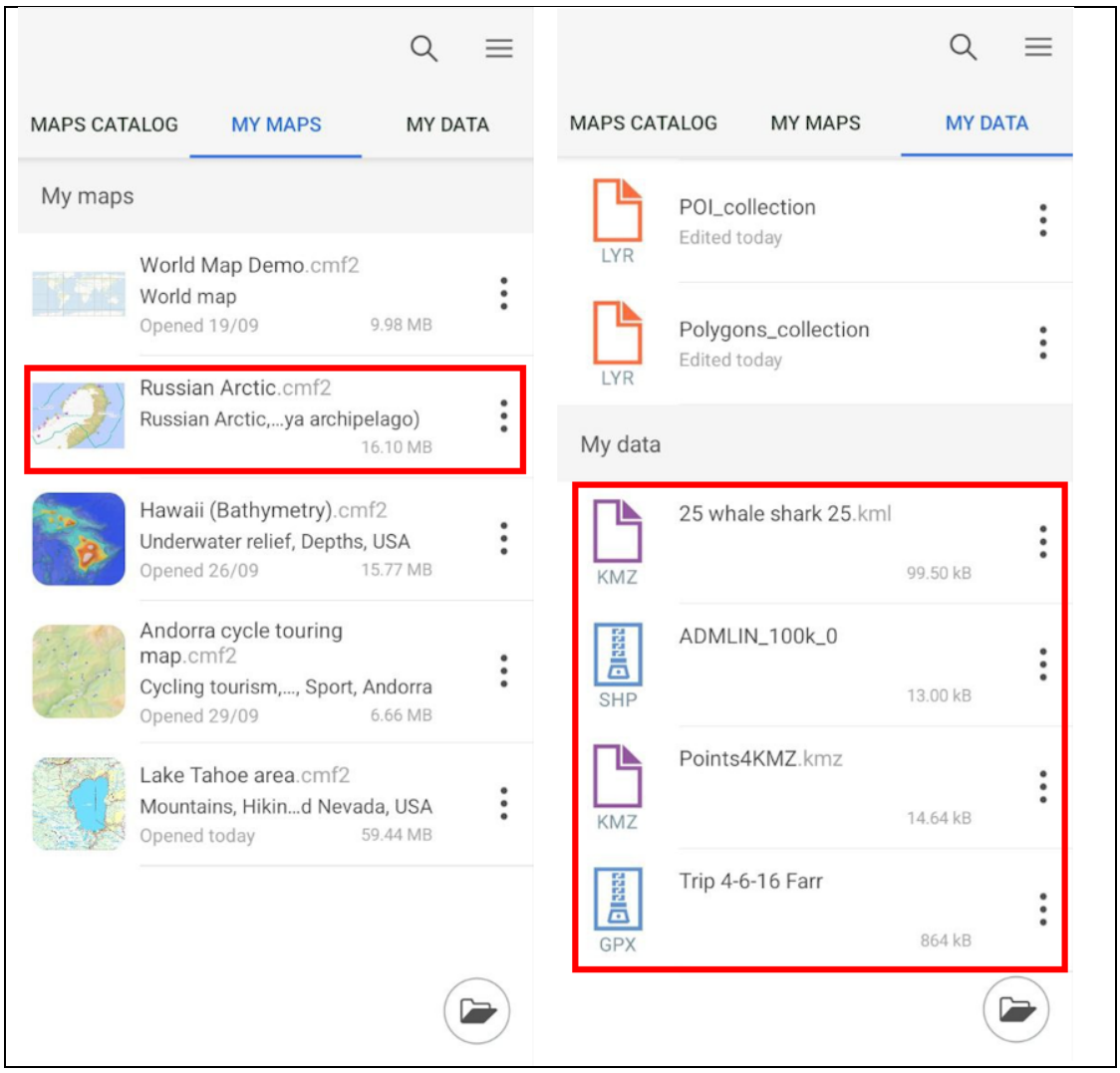
Navigate to the data folder on the PC. Copy the necessary files.



Navigate to the connected mobile device. Paste the selected files into the application folder.

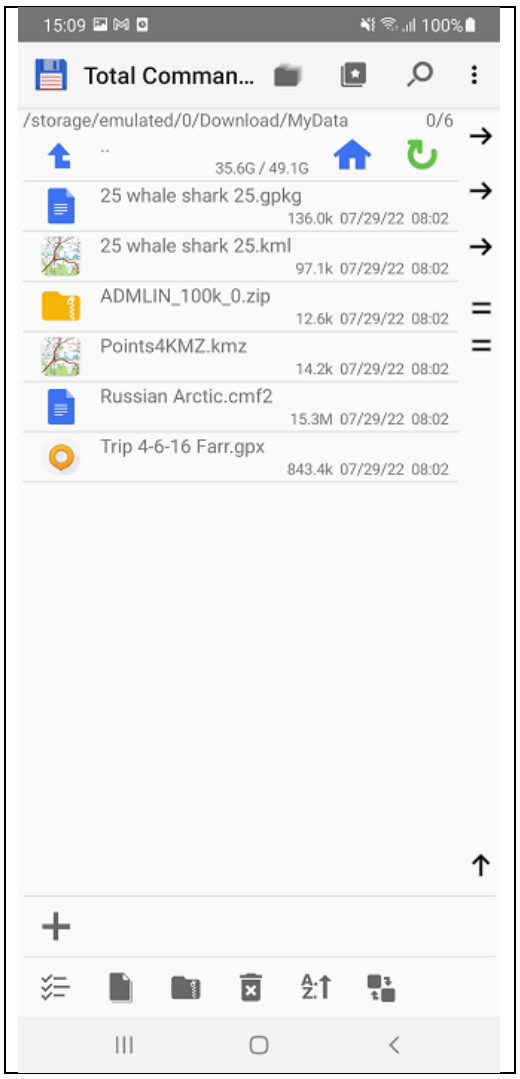


Open the CarryMap app on your mobile device. The copied data will be displayed in the corresponding sections.

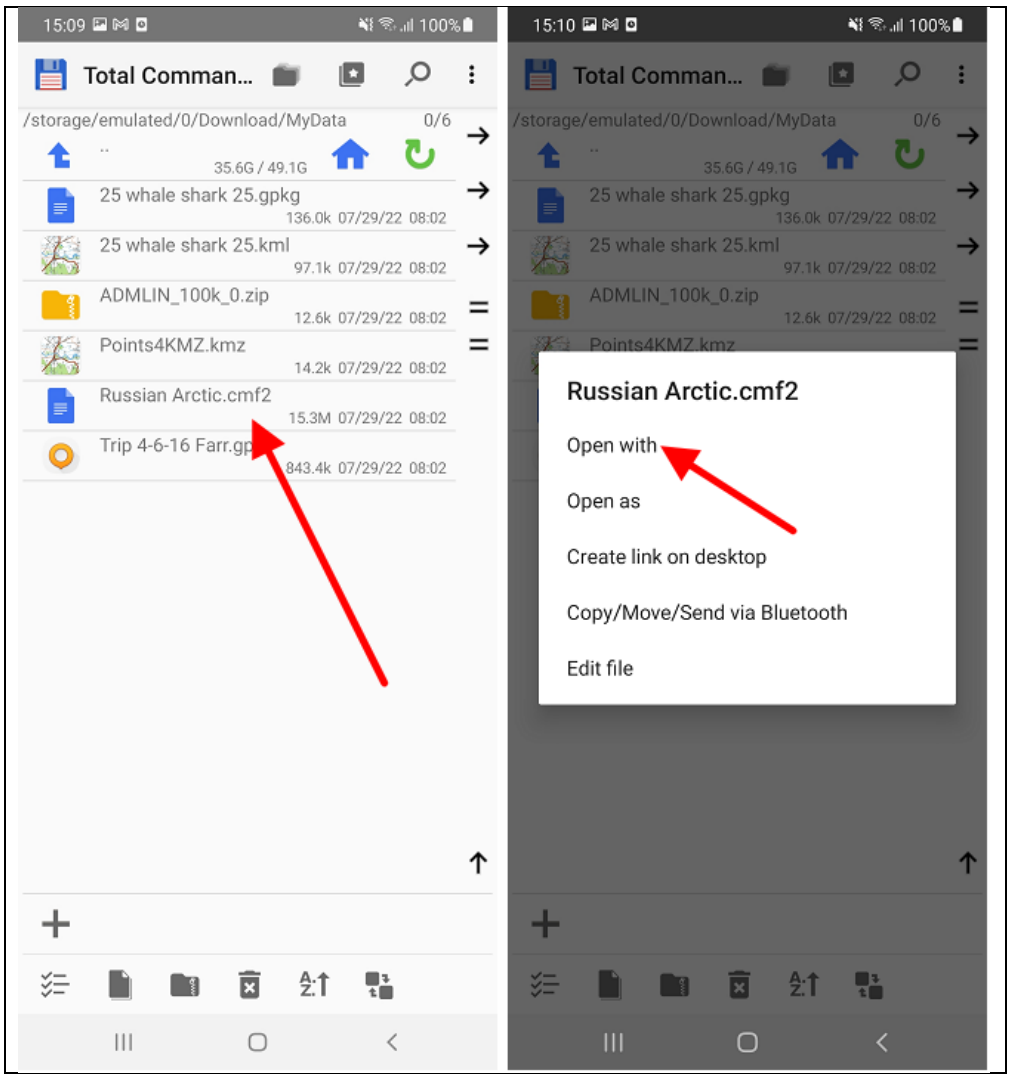


Data transfer by standard means of file managers

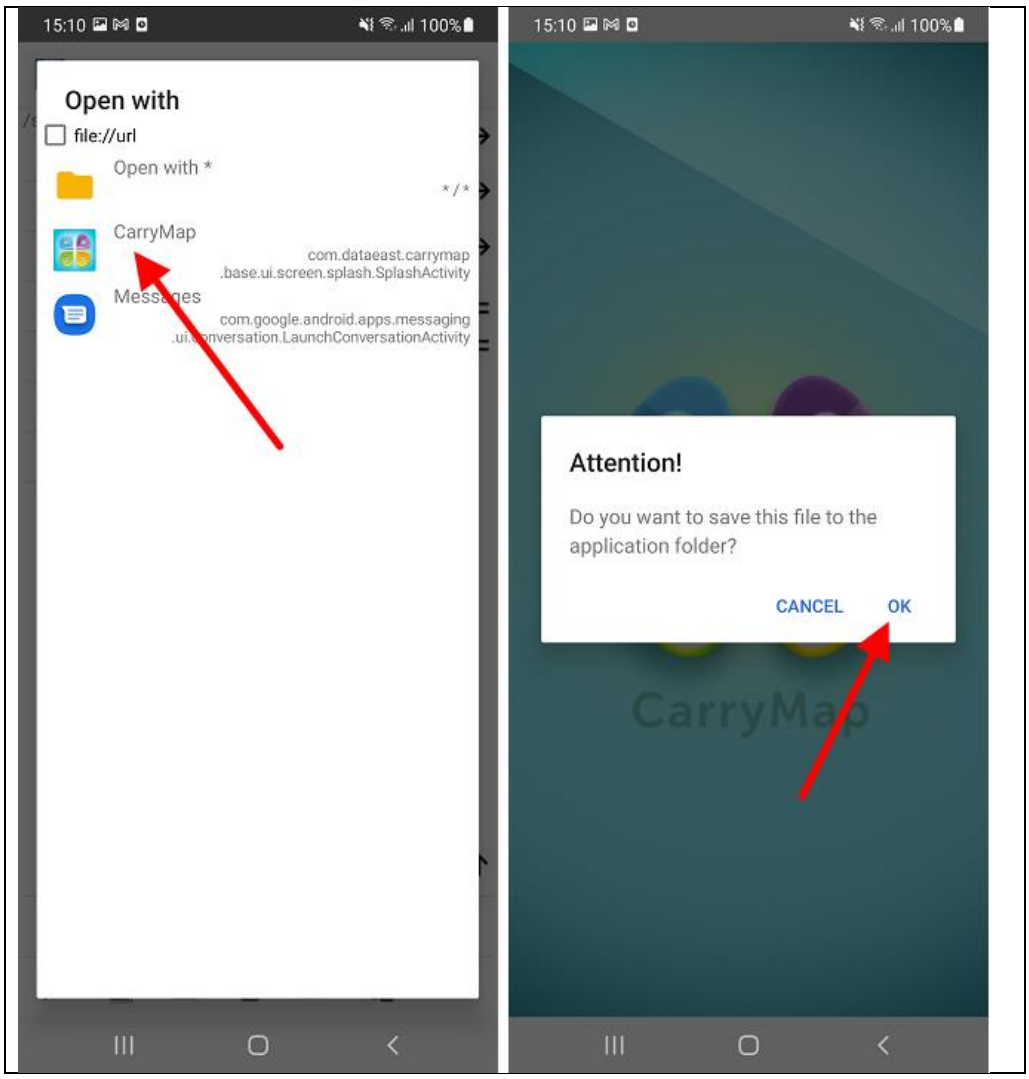
Open a file manager (for example, Total Commander) on your mobile device. Navigate to the data folder.



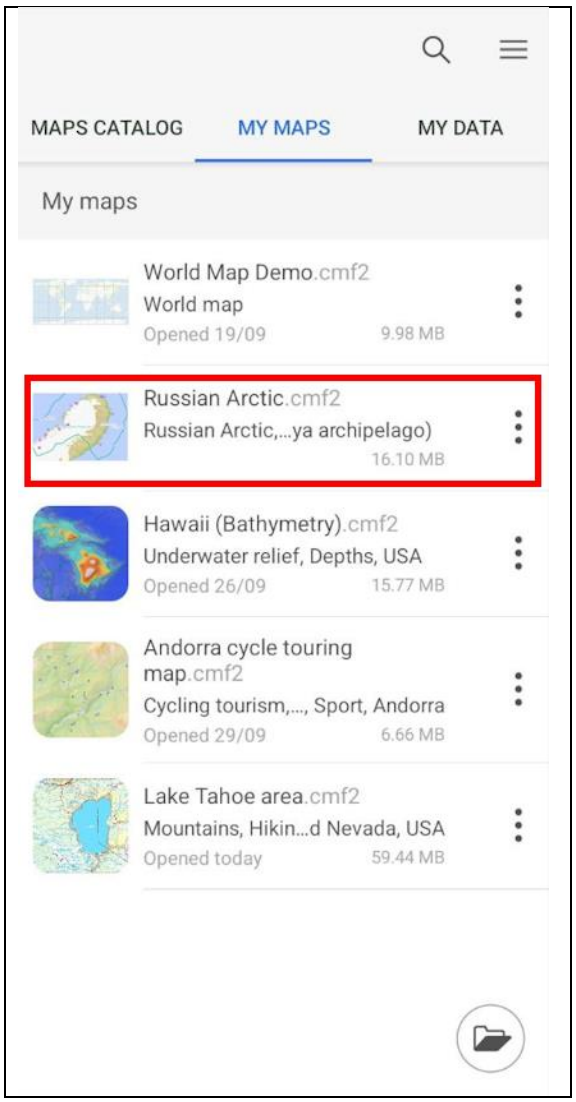
Select the file to add to the CarryMap application. In the context menu, select "Open with".



In the list provided, select CarryMap. Save the file.



The data will be added to the library of the CarryMap application.

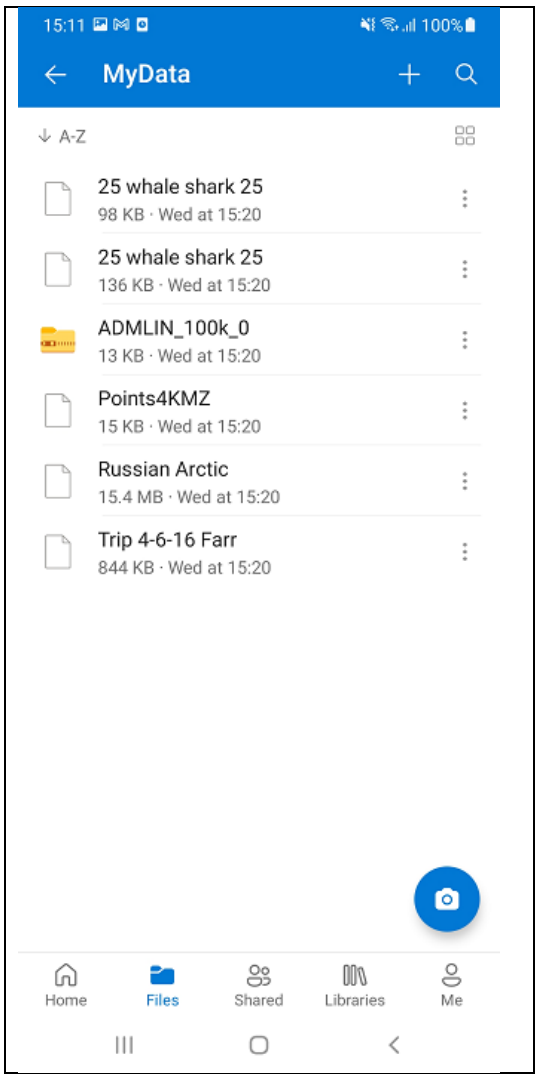


NOTE: The behavior in the file managers installed on your mobile device may differ from the one described above and depends on the restrictions on the support of various data formats in a particular application.

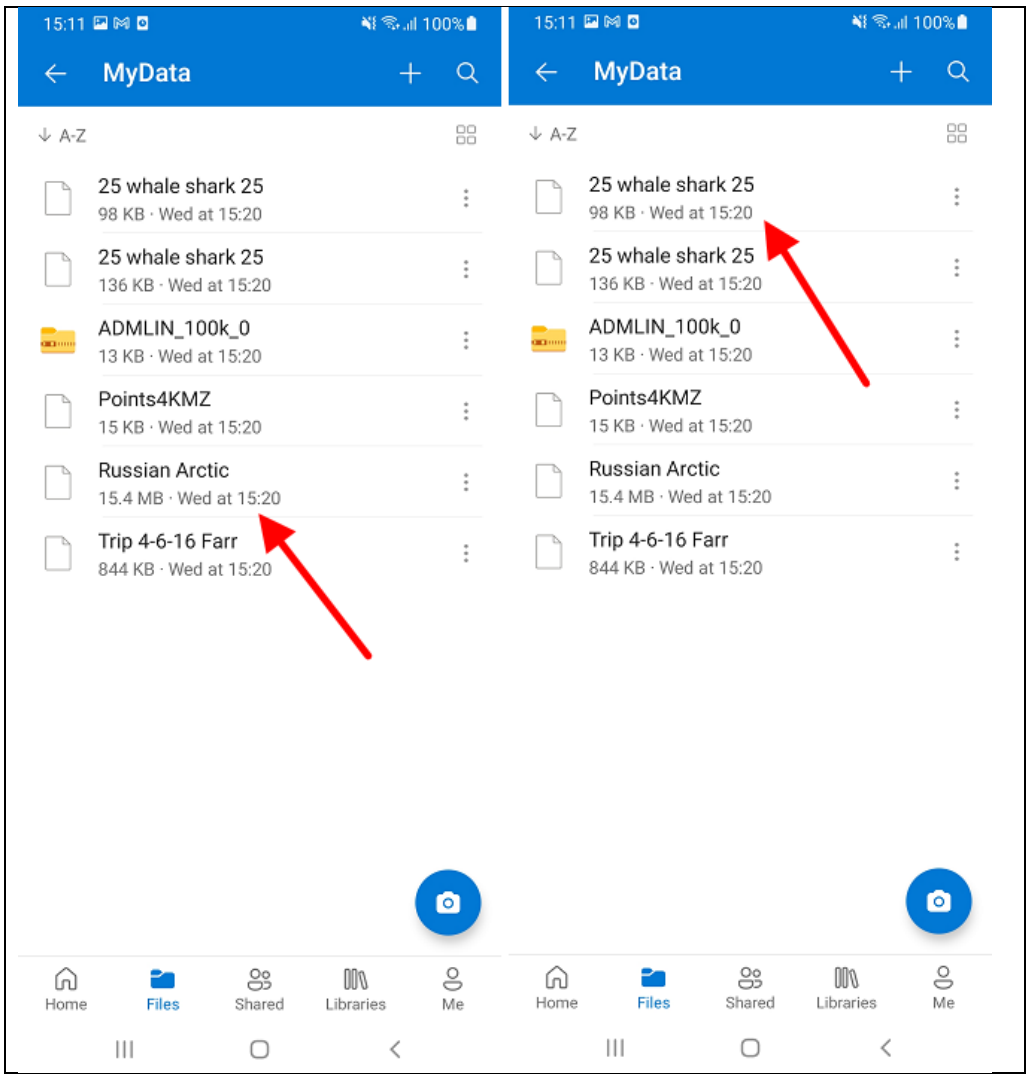
Importing data from cloud storage

Please note that importing data from cloud storage is only possible if you have access to the Internet.

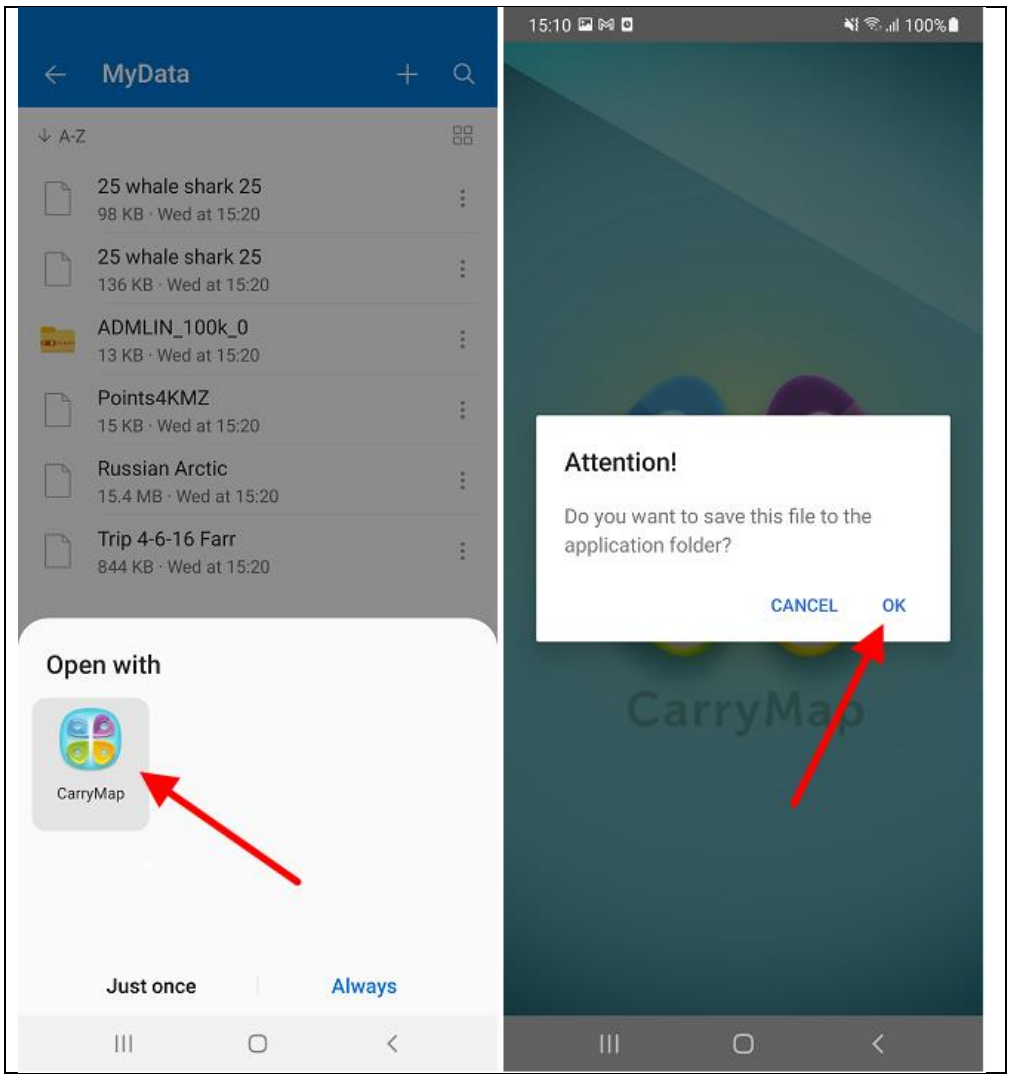
Open a cloud storage (for example, OneDrive) on your mobile device.



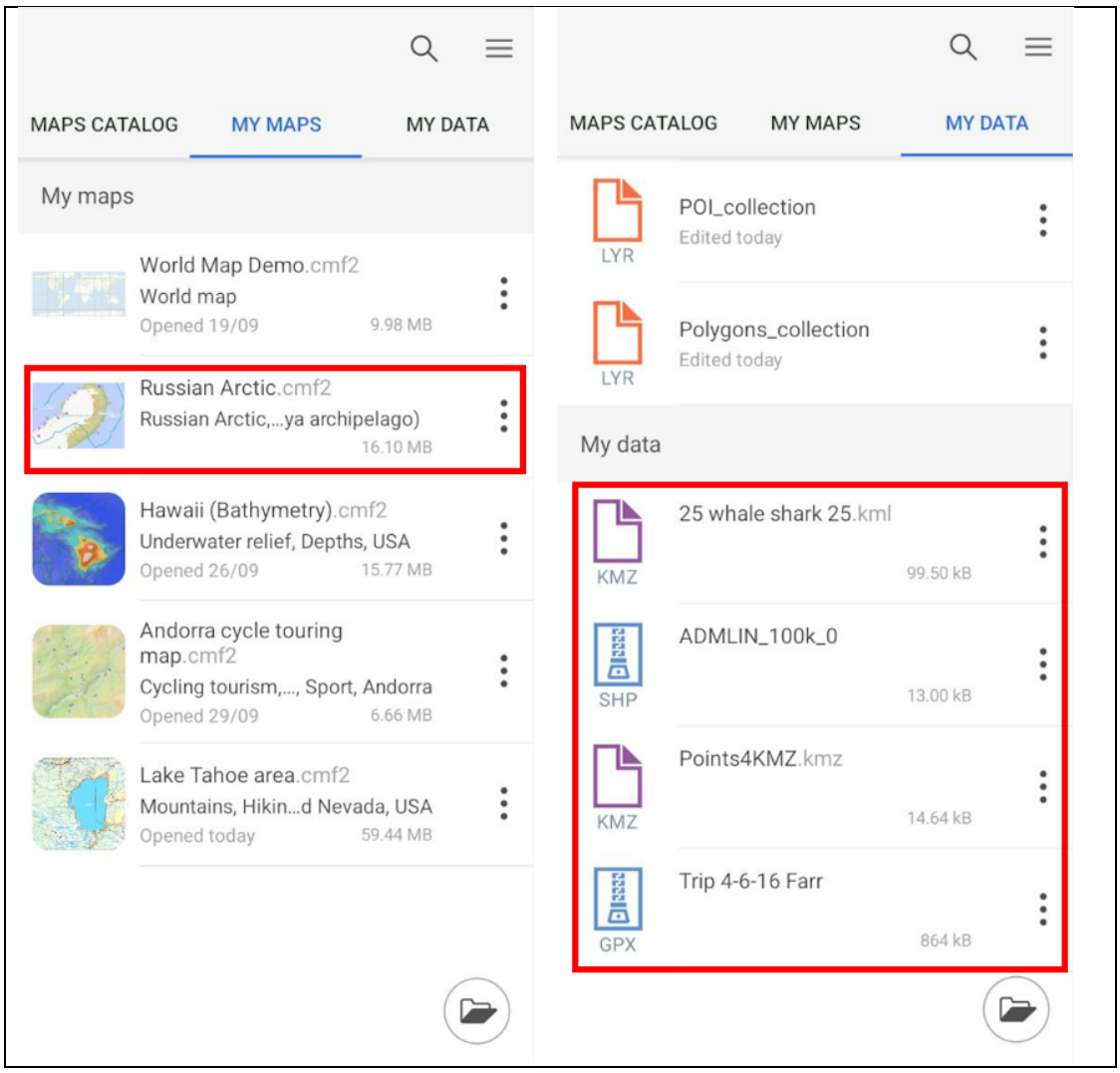
Select the file to add to the CarryMap application.



In the list of programs to open, specify CarryMap. Save the file.



The data will be added to the library of the CarryMap application.

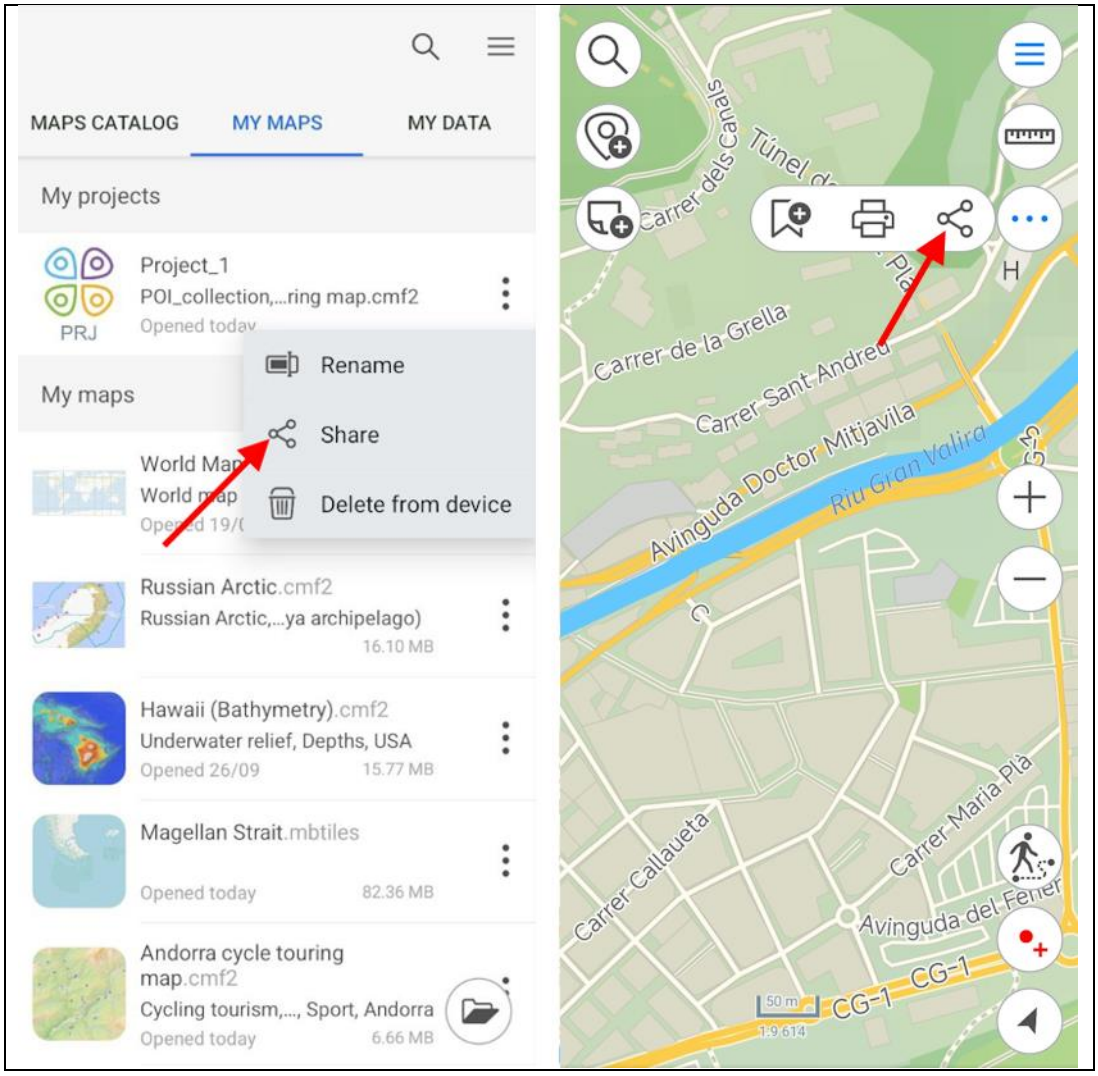


NOTE: The behavior in different cloud storages may differ from the one described above.

Sharing data

The CarryMap application supports the ability to share all application data.

Take advantage of the new ability of exchanging projects between the mobile and the desktop app versions. The new format of the project's archive, CMPRJ, is common for all app platforms (Android, iOS, Windows).
In the mobile version of the app you can share a project both from the list of maps and projects at the "My maps" tab of the application start window and from the map window.
To share a project at the My Maps tab, open the project menu by tapping three dots and select *Share*.
The project can also be shared from the map window. To do this, go to the *Additional tools for working with the map* and click the *Share* button.

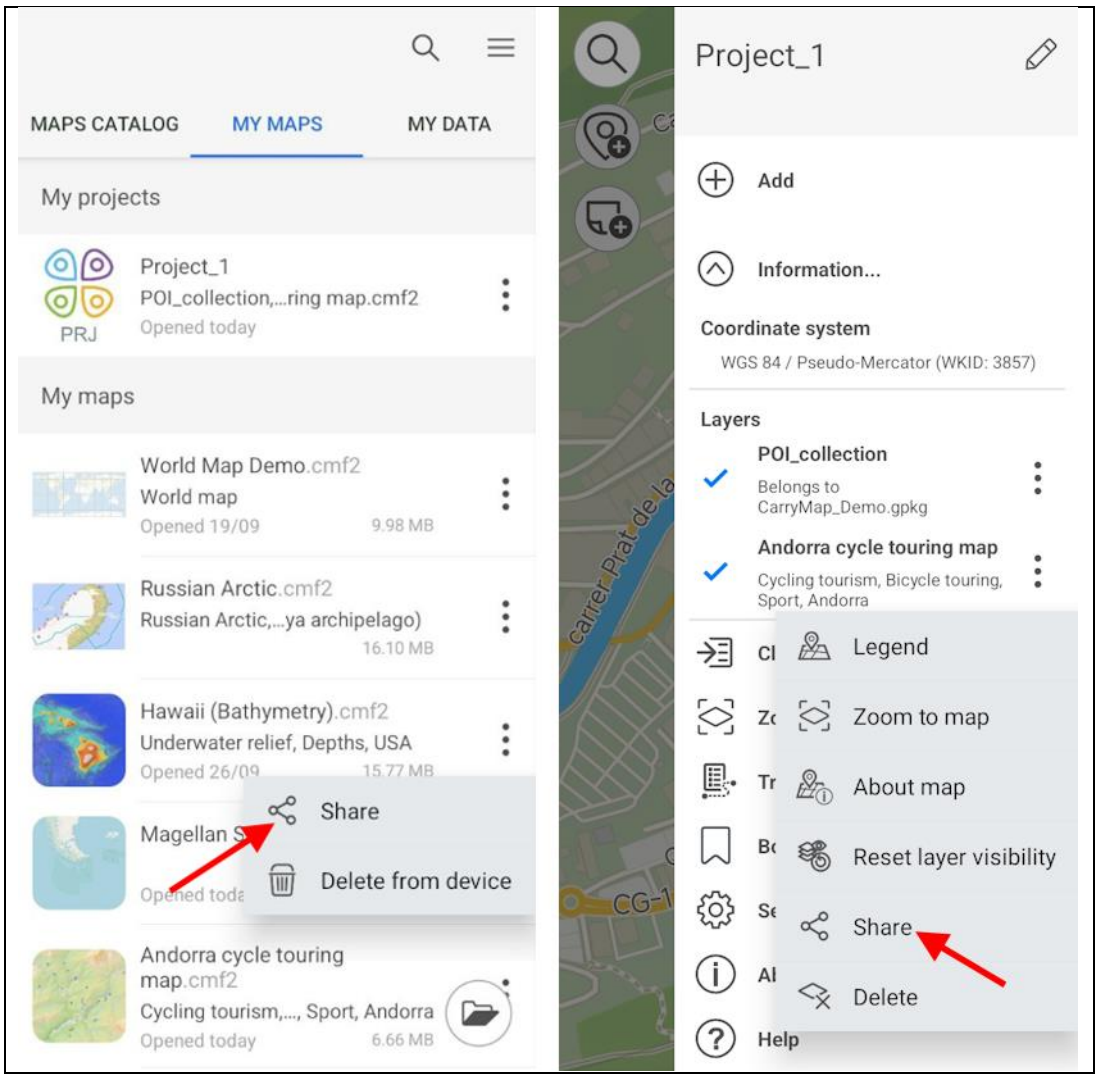


Then select the desirable method to use to share the project archive file.

You can also send your maps, layers and datasets, as well as links to online mapping services from the catalog of maps and data and from the list of project layers.

To share a CMF2 file open the maps menu on the My Maps tab on the start page or the Page for adding data and maps layers by tapping three dots and select *Share*.

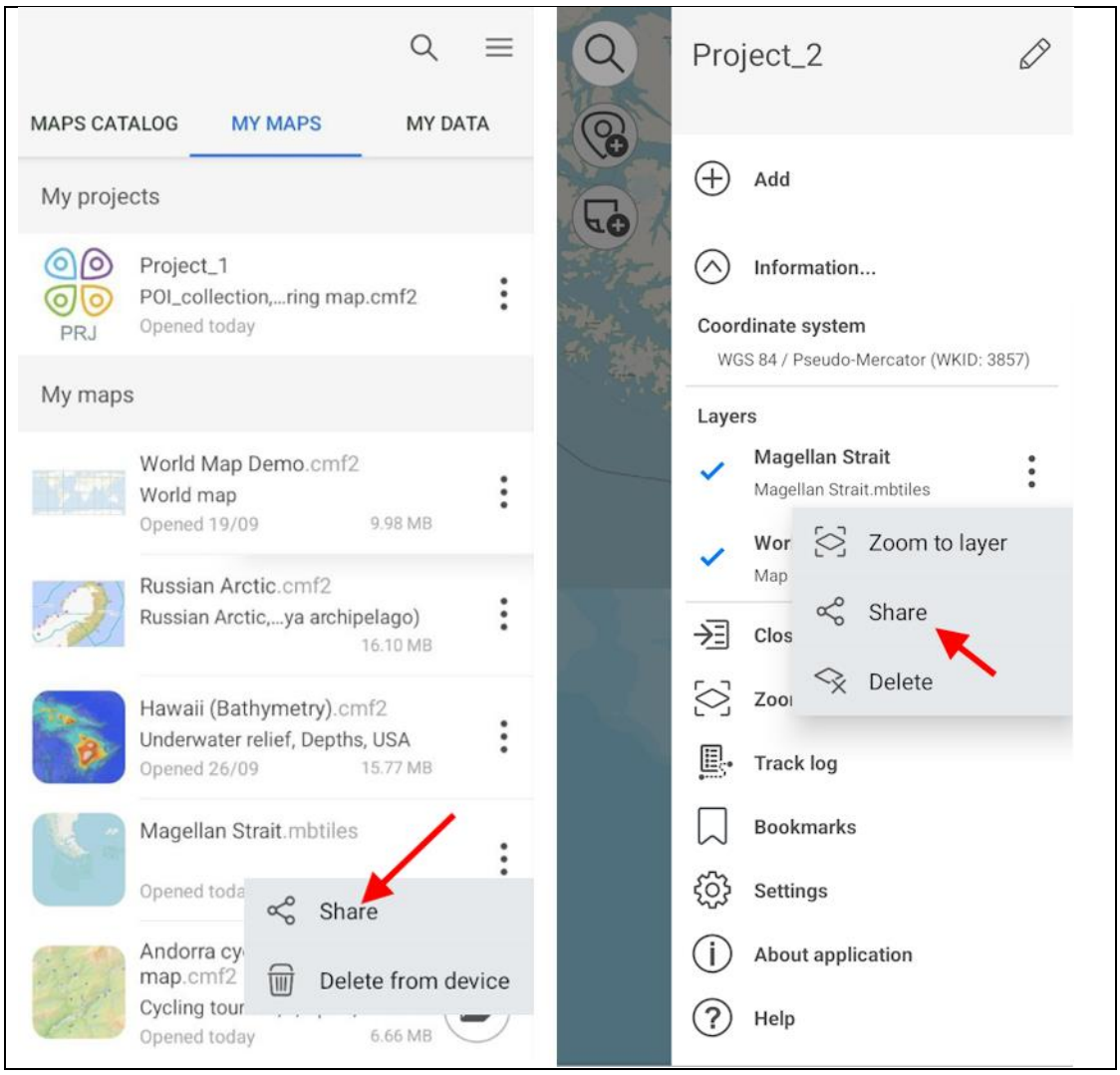
The CMF2 map can also be shared from the list of project layers. To do this, open the layer menu and select *Share*.



Then select the method you want to use to share the map file.

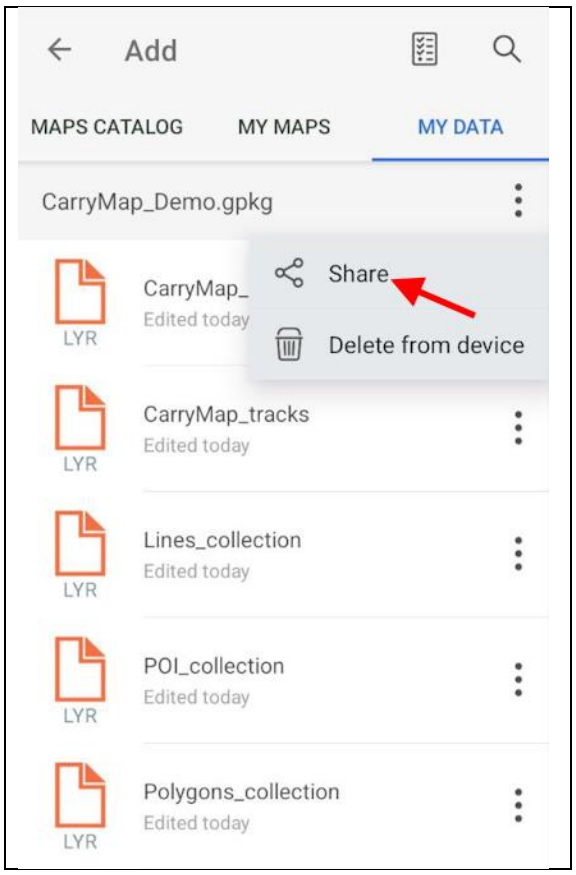
To share a MBTILES file, open the map menu on the My Maps tab on the start page or the Page for adding data and maps layers by tapping three dots and select *Share*.

The MBTILES map can also be shared from the list of project layers. To do this, open the layer menu and select *Share*.



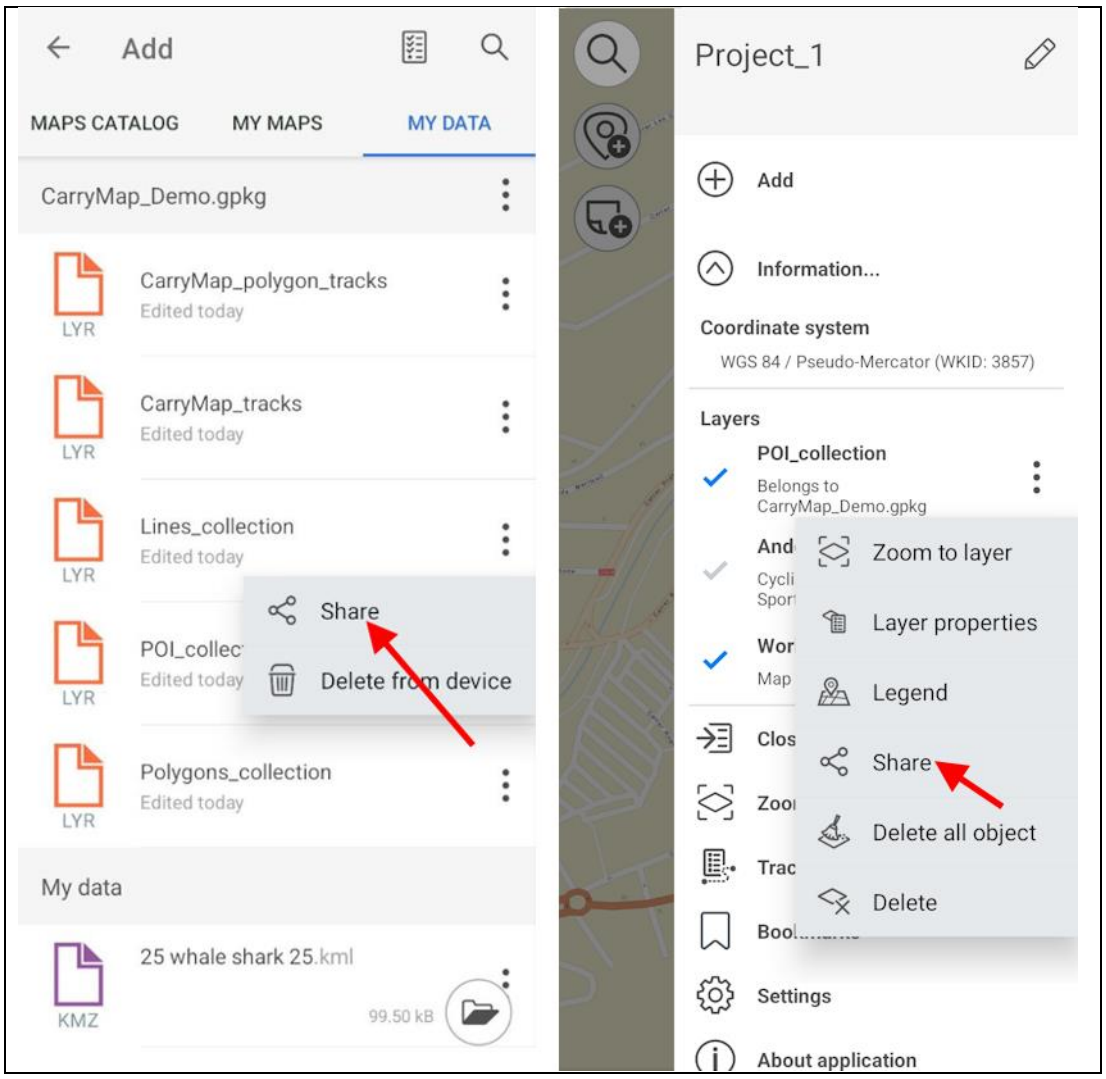
Then select the method of sharing the map file.

To share GeoPackage datasets, .KML/.KMZ, .GPX or .SHP, select the My data tab, open the file menu by tapping three dots, and select *Share*.

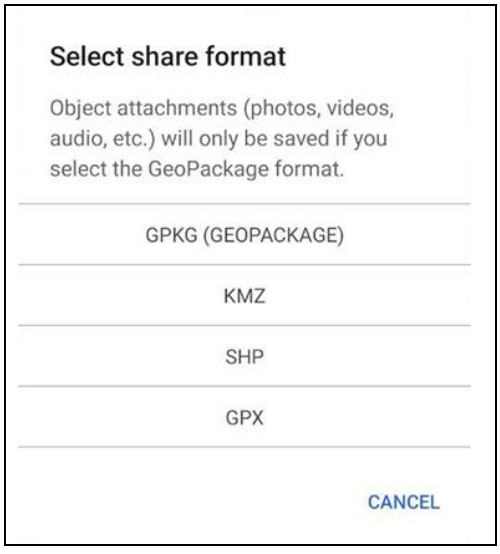


Then select the method you want to use to share the file.

To share GeoPackage file layer, select the My data tab, or open the file menu by tapping three dots, and select *Share*.

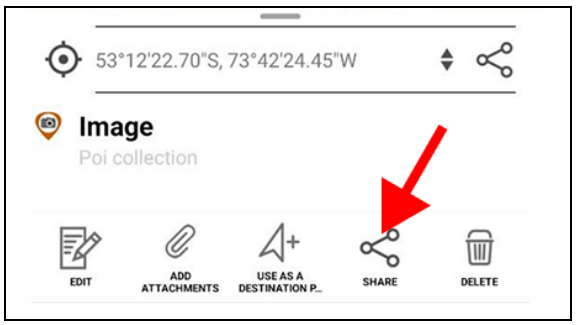


In the appeared dialog, select the data format.

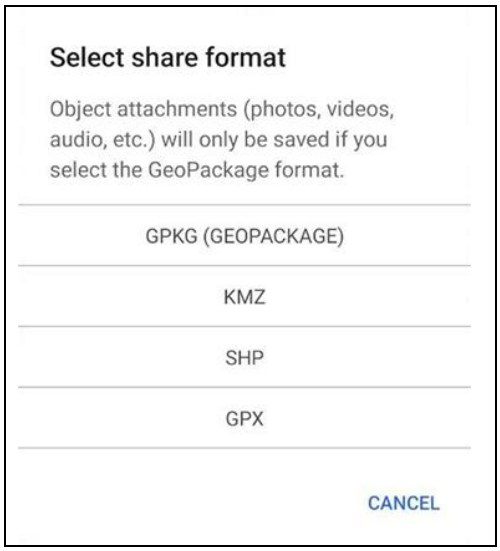


After selecting the format, select the method you want to use to share the file.

Besides, you can share one object of the GeoPackage layer by tapping on it in the map window and selecting *Share* in the card that opens.

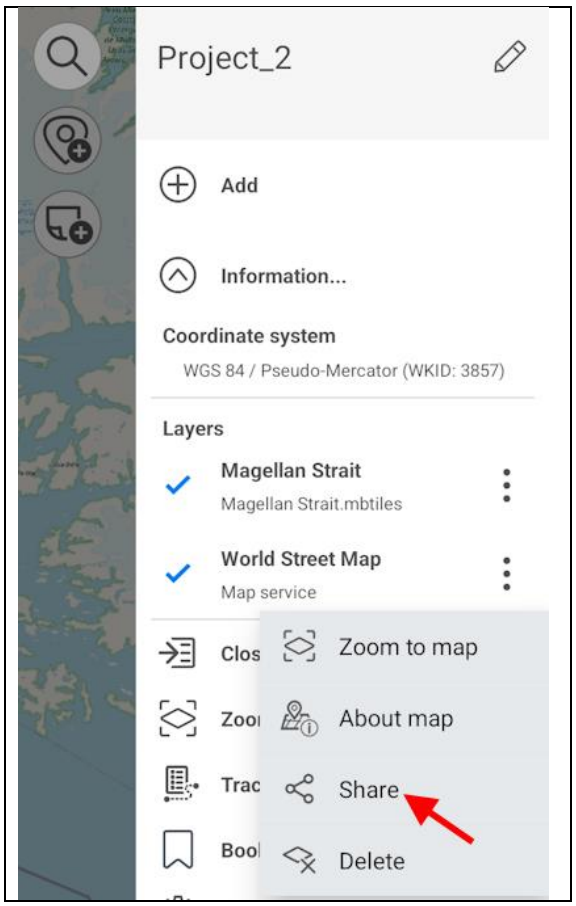


In the appeared dialog, select the data format.



After selecting the format, select the method you want to use to share the file.

To share a link to an online mapping service, open the layer menu in the project layers list by tapping three dots and select *Share*.

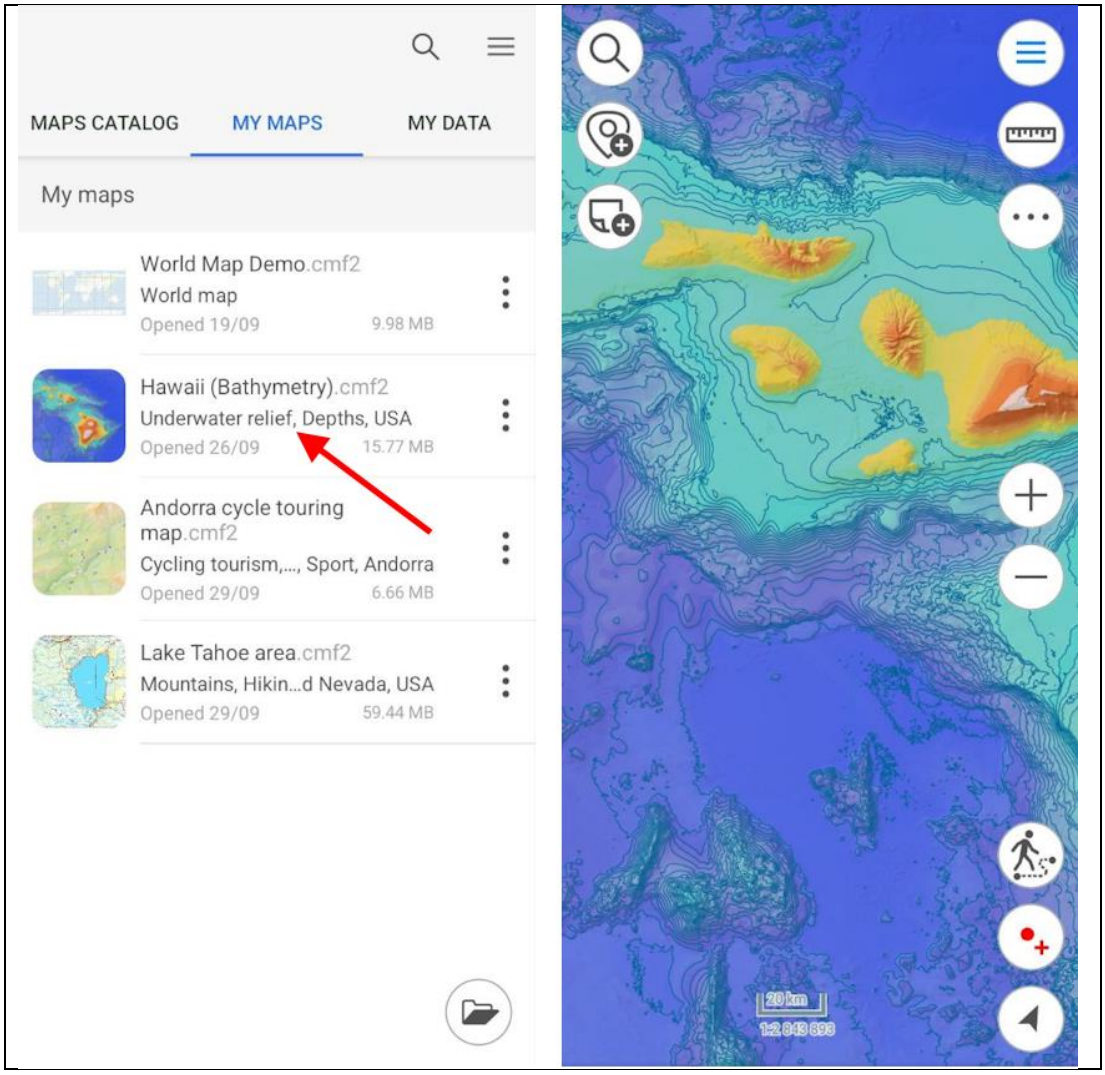


Select the method to share the link.

Section 3. Opening maps and creating projects

Opening map

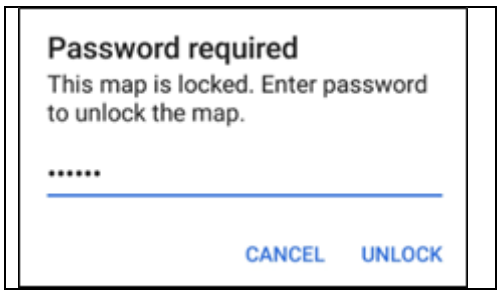
To open a map stored on the device, select it from the list in the Maps Catalog window.



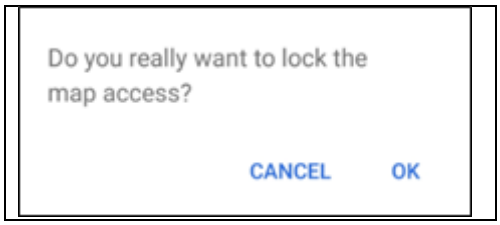
The map will be opened automatically.

Working with protected maps

Maps in the CMF2 format can have several types of protection (configured when creating a map), such maps are marked with additional symbols in the Maps catalog. The maps protected with password are marked with the lock icon. To open the password protected map, tap its name, enter password in the appeared window and tap *Unlock*.



The map will be opened in the project. Now access to this map is allowed, to lock it again, go to *My maps* tab, press in the appeared window, and then *OK*.

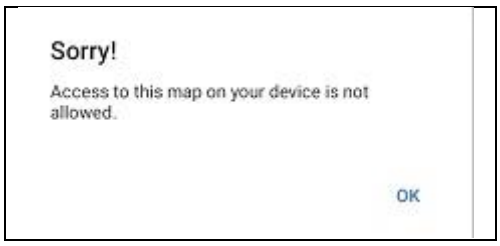


Access to your map is locked and you will need to enter password again to continue working.

Maps that are protected with the validity period are additionally marked in the list of maps only if the validity period of the map has not started yet or has already expired. If the map validity has expired at the time you open it, the map icon looks like and the appropriate message appears.



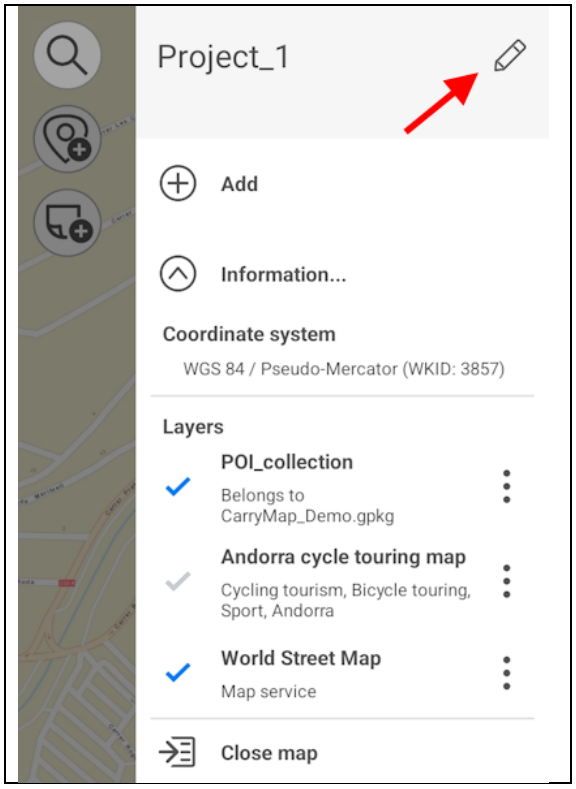
Maps that are protected by device ID are additionally marked in the list of maps only if the access to the map is not allowed for your device. In this case, a symbol will appear next to the map, and when you try to open such a map, a corresponding message appears.



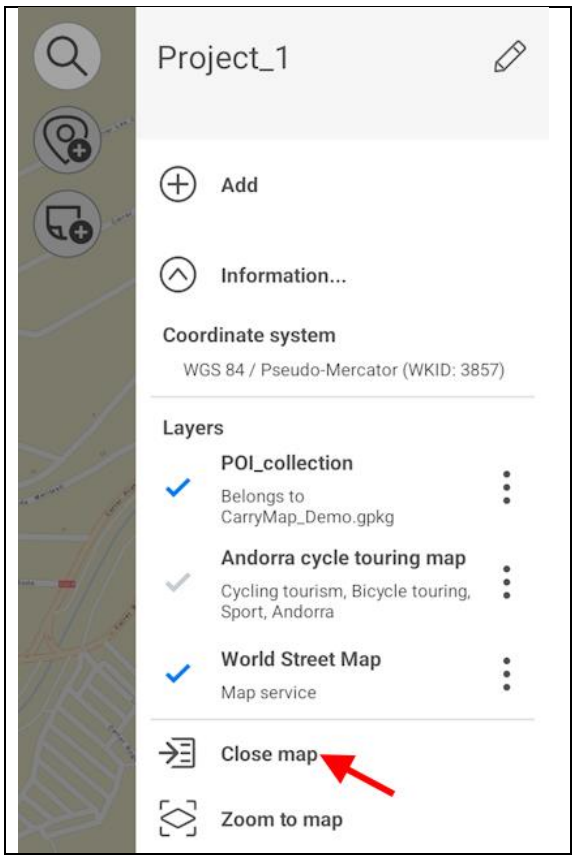
Creating and opening project

The project is created automatically when you open CMF2 or MBTILES map and add a layer of any format to it, or when you create point, line, or polygon feature on the map.

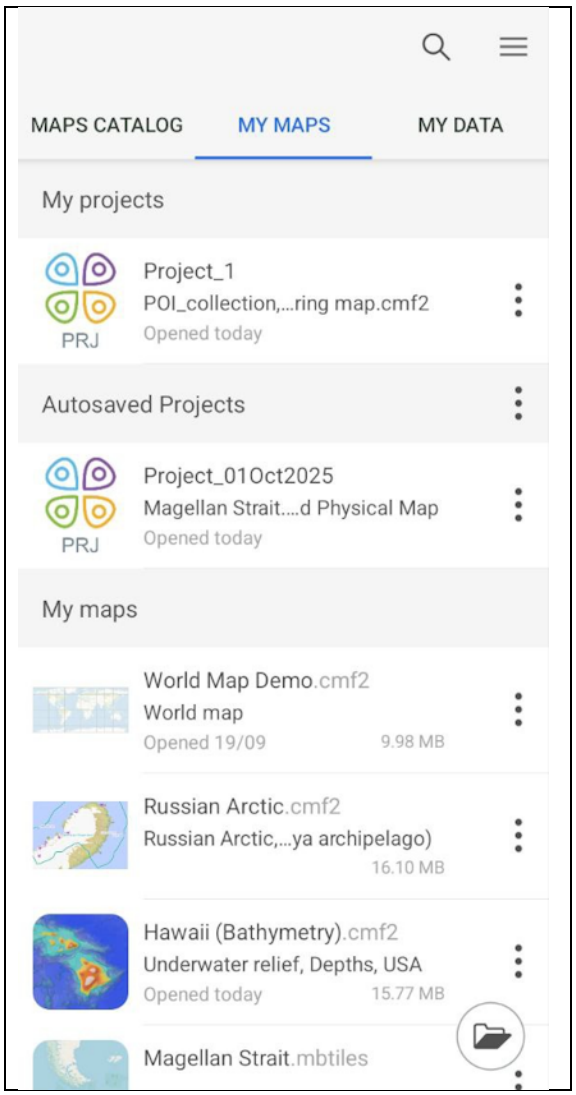
The project name can be changed in the map menu, to do so, tap the editing icon. Enter the new name and tap *Enter*.



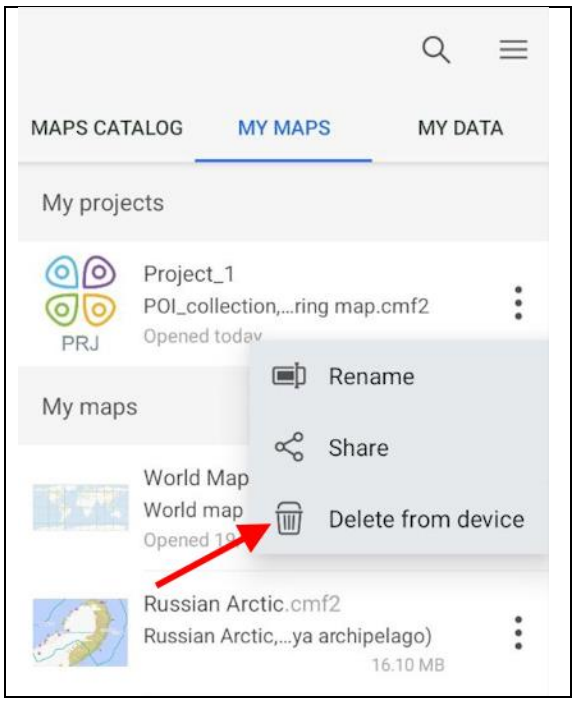
To open the project stored on your device, go to the *Map catalog* by tapping *Close map* button in the Main menu.



In the *My maps* tab all the previously saved and autosaved projects are stored.



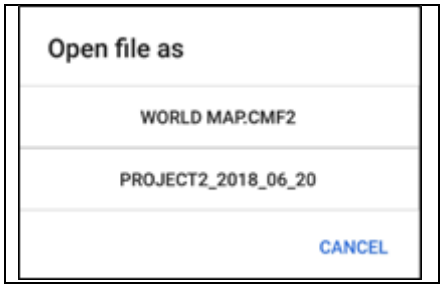
To open project, select it from the list. To delete project, select three dots menu and select *Delete from device*.



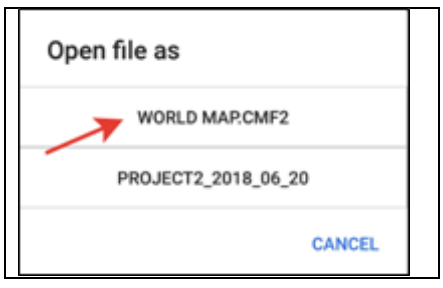
NOTE: Data and maps deleted from the device cannot be restored.

To change name for project, tap *Rename* in the menu, enter the new name, and tap *OK*. If you rename autosaved project, it will be moved to the *My projects* section.

If the selected CMF2 or MBTILES map is used in other projects, the appropriate message will appear.

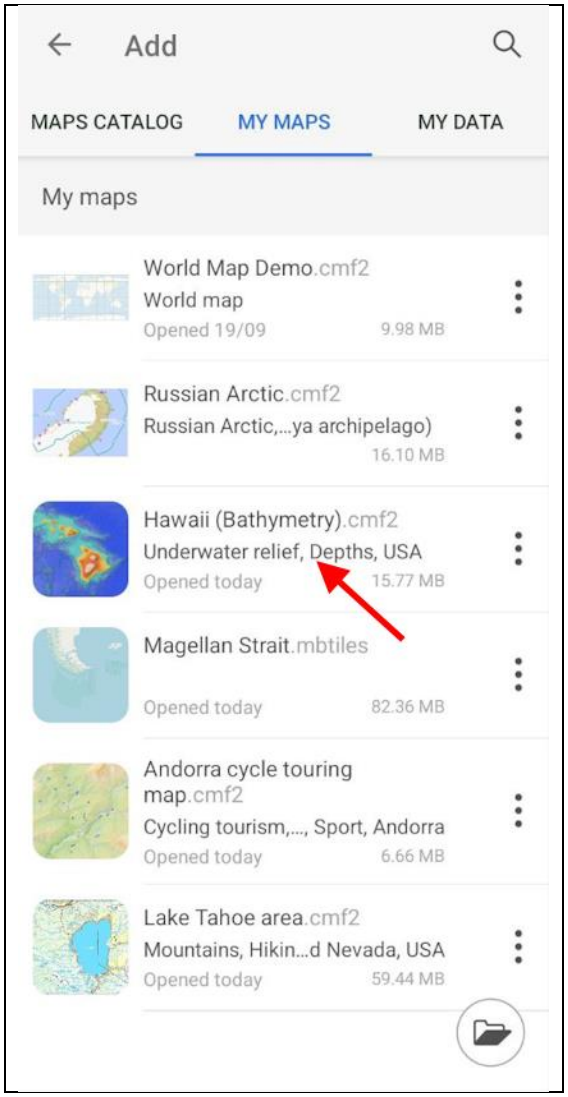


To open map as a project, select the project from the list. If you need to open the map only, select it from the list.

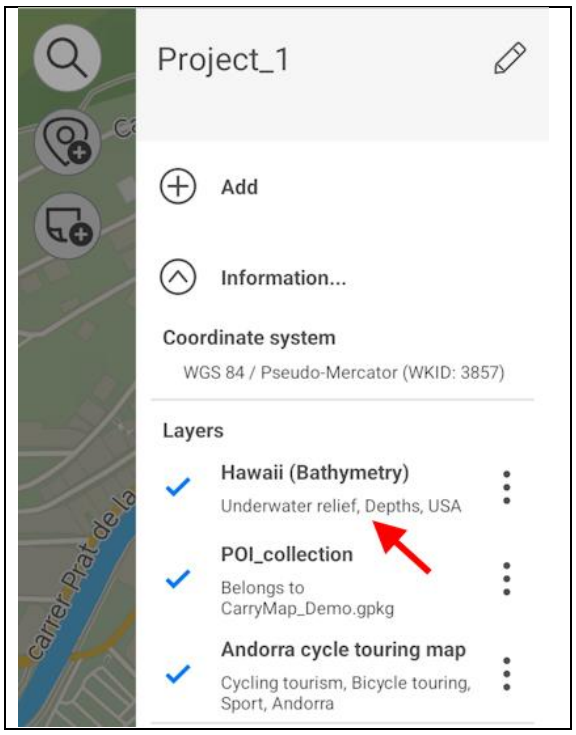


Adding maps and data to project

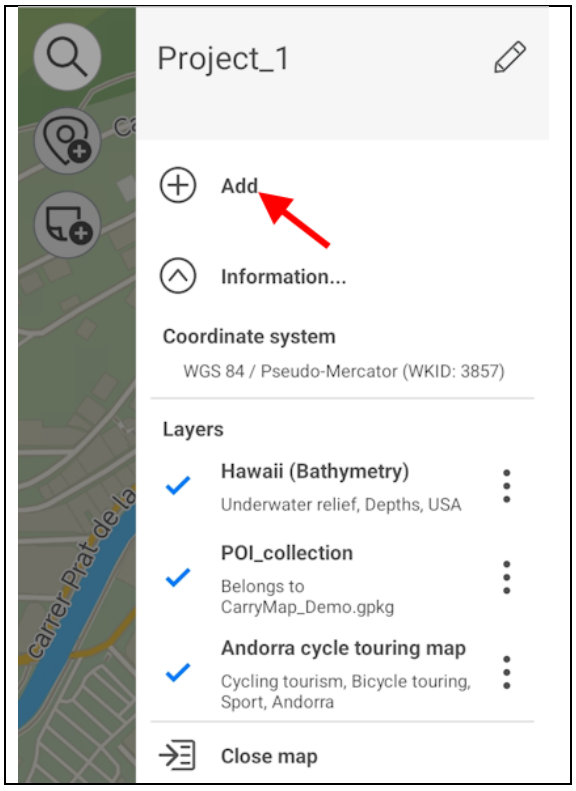
If you want to add the map to the project, tap Add and go to *My maps* tab containing all maps in CMF2 and MBTILES formats stored on your device.
Select the map you want to add from the list.



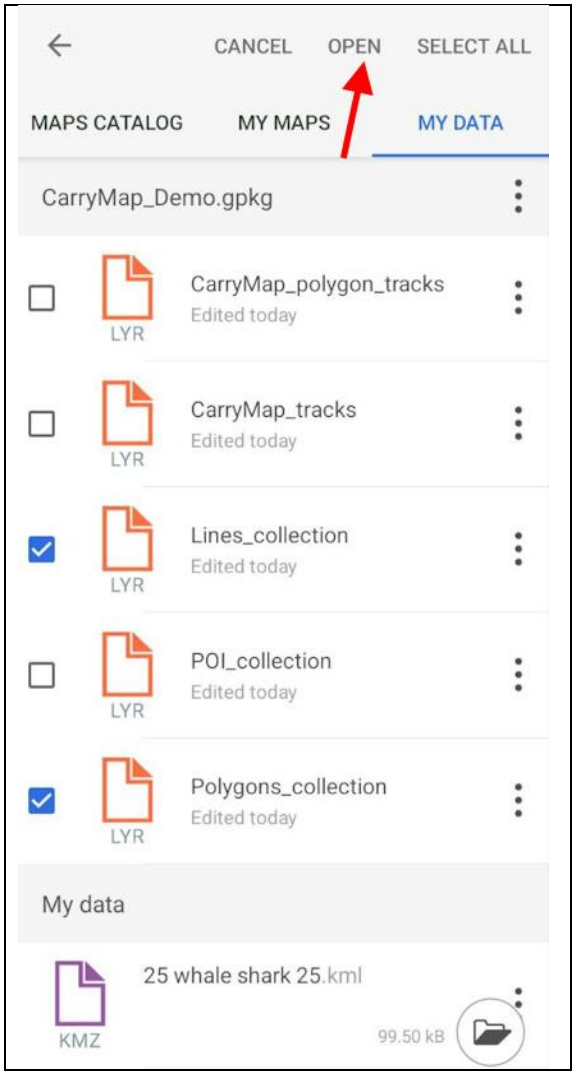
Map will be added to the current project.



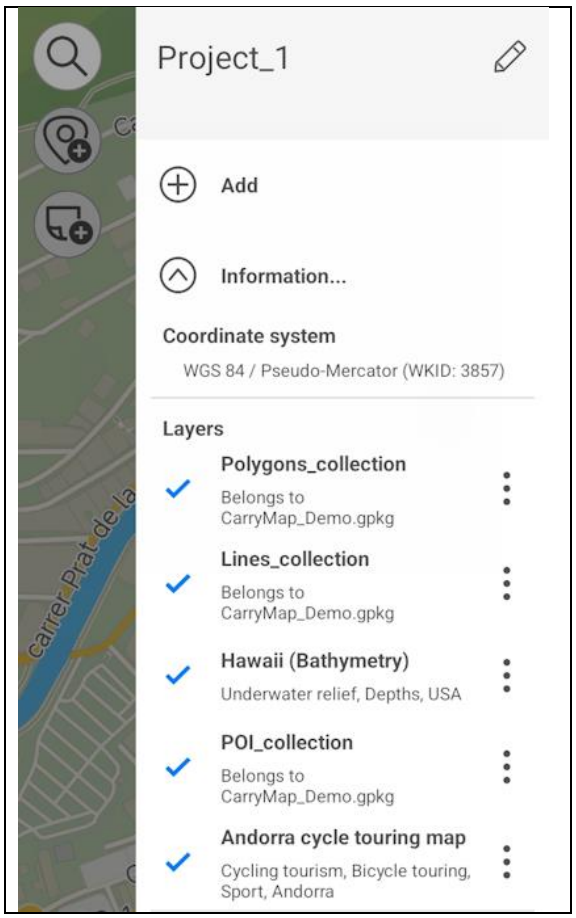
To add layer to current project, tap Add button in the map menu and select the *My data* section.



Select the required layer from library and it will be added to your current project. If you need to select multiple layers, tap *Select all* or long tap the required layers and then tap *Open*.



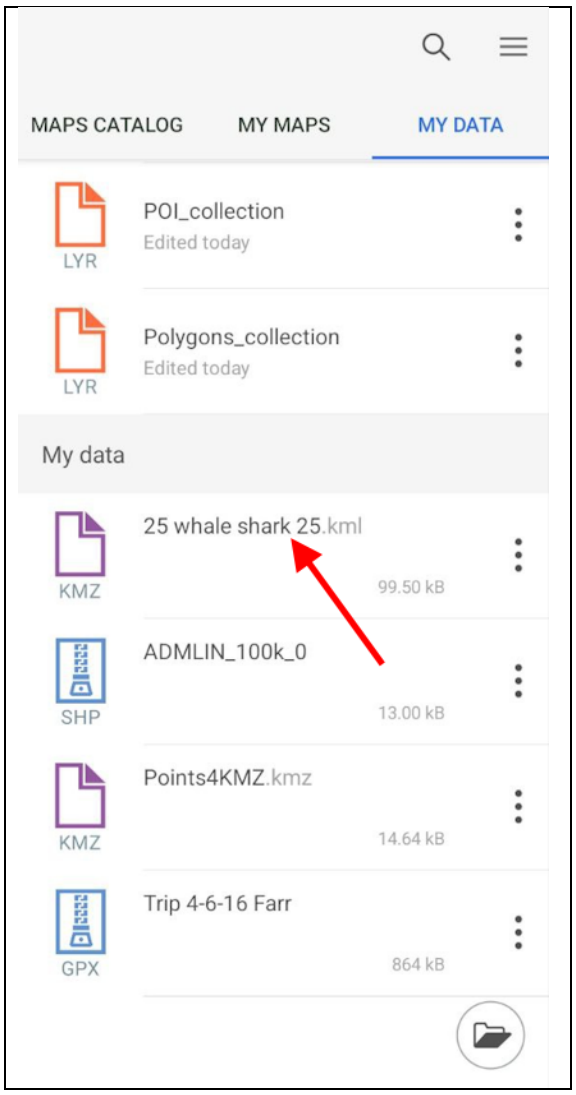
Selected layers will be added to the project.



Automatic data conversion

The CarryMap application works directly and provides access to create and edit objects in layers of GeoPackage format files (see *Creating new features* and *Editing features*). When opening data of other supported formats (KML/KMZ, GPX, SHP), automatic conversion to GeoPackage format occurs.

To open the data of KML/KMZ, GPX or SHP format, go to the page for adding data and select the My data section (see *Page for adding data and maps*). Click on the selected file, the file will be automatically converted to the GeoPackage layer.



After successful conversion, you will see the corresponding message.



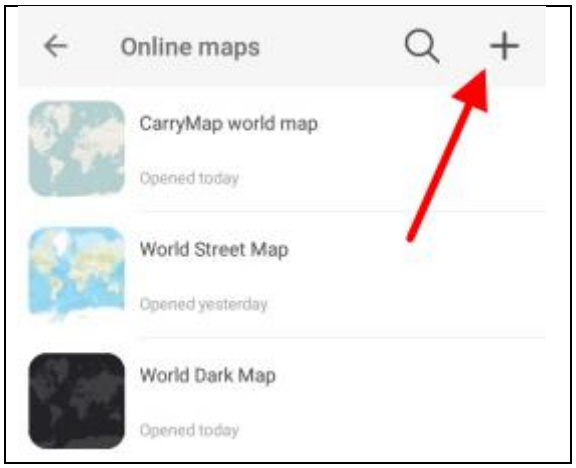
In the window that appears, click *OK*.

Converted gpkg layer will be added to the project.

Adding online services

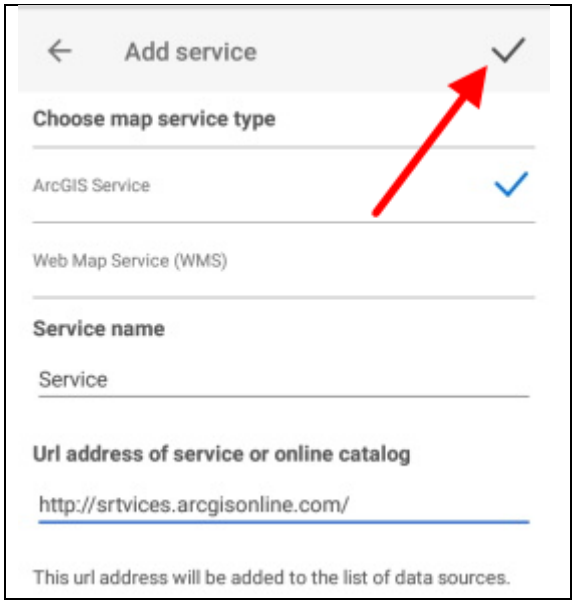
To add the online map service ArcGIS or WMS to your project, tap 

button, go to *Maps catalog* and select *Online maps*. You can select the online service from the provided list or add the new one.
To add the new online service ArcGIS or WMS, tap *Add* button.

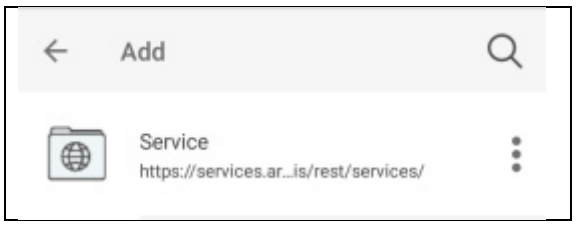


If you already have connected services, they will be shown in the list in the Services tab. If you need to add another service, tap *Add*  .

Select the required service type, enter its name and link to this service.



Fill in all the required fields and tap *Done*. The added service will be shown in the *Services* tab.

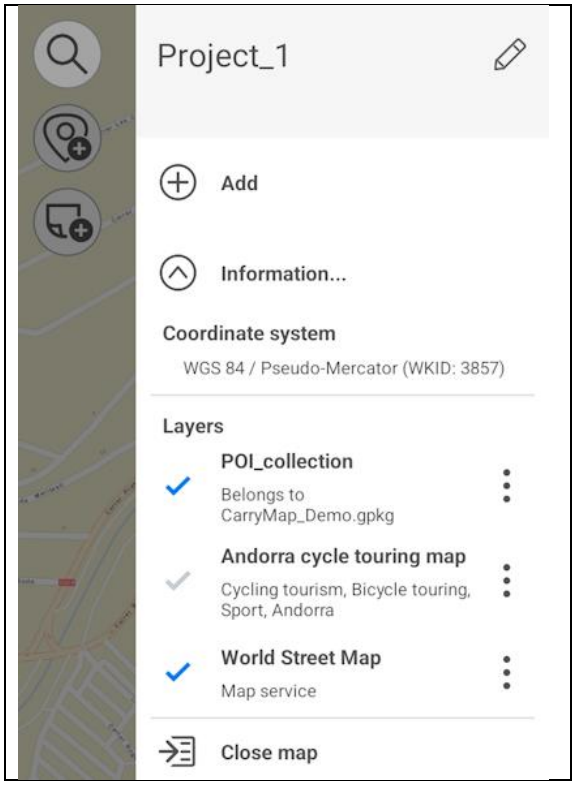


Select the required map from the service and it will be added to your project.

Working with layers in project

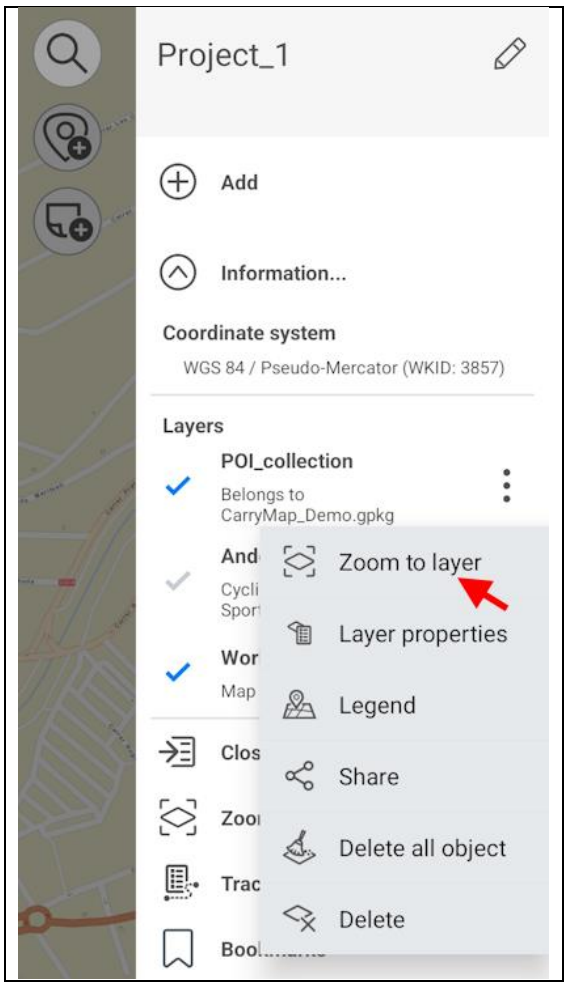
All layers added to project can be viewed in the map menu.

To turn off layer visibility, tap ✓ near the required layer name and the icon will change its color to grey ✓. Note that the layer will not be deleted from the project, it just will not be shown on the map. To turn the hidden layer on, tap the icon near its name again.

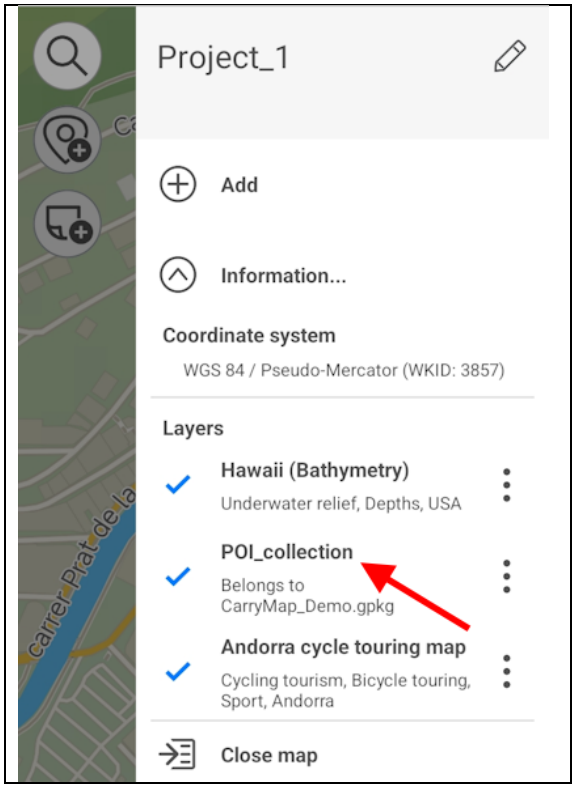


You can change the layers order in the project. To do so, long tap the layer and drag it to the required position in the list of layers. If the layer is the first one in the list, it will be displayed on top of all layers on your map, accordingly.

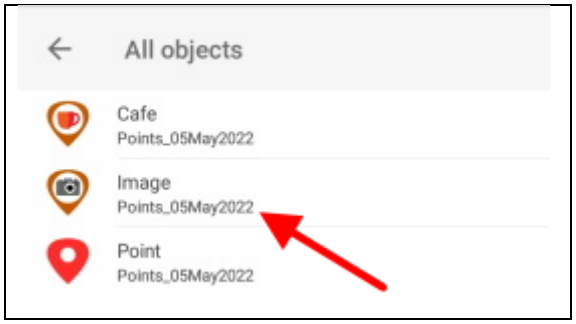
To zoom to layer in the project, tap the three dots menu and select *Zoom to layer.*



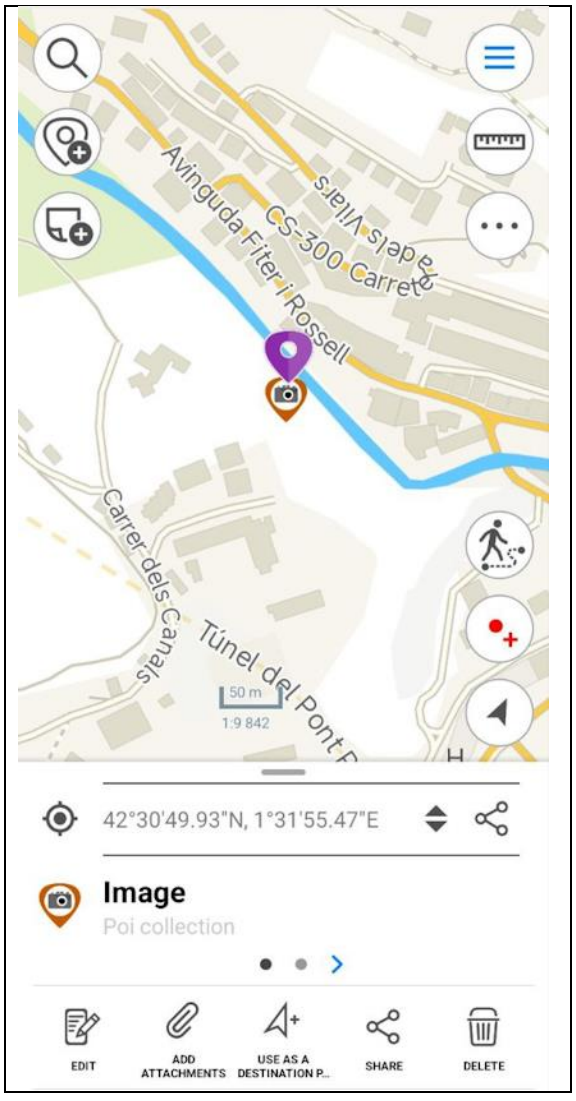
To view all features in the GeoPackage layer, tap the layer in the map menu.



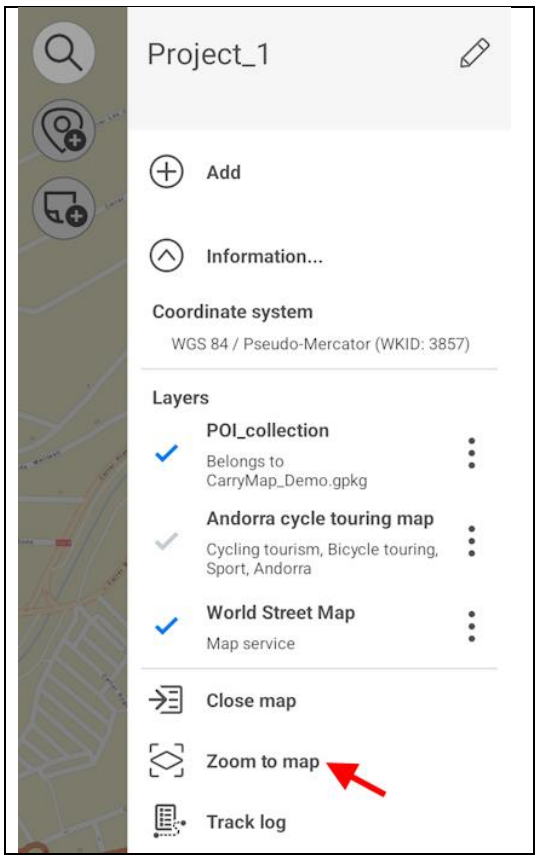
All features containing in the layer will be shown in the list.



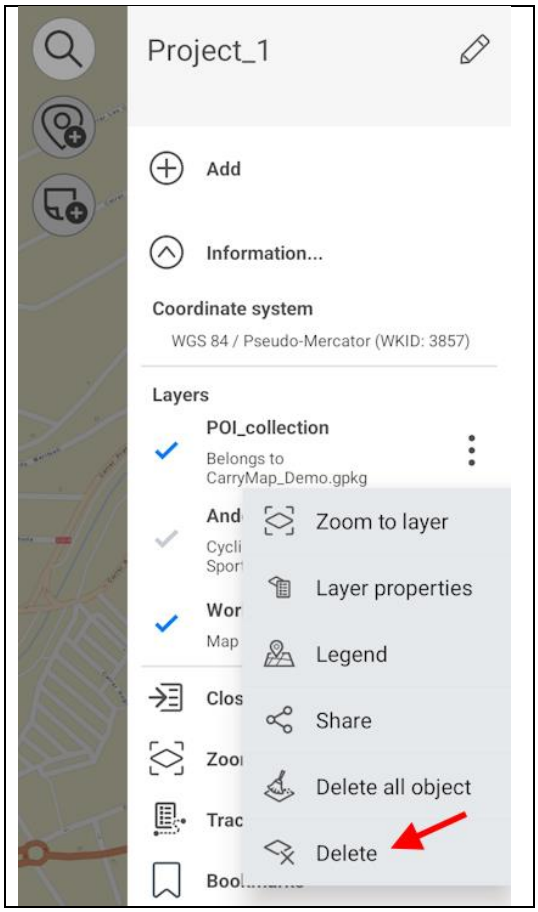
To view feature on the map, select it in the list and it will be highlighted on your map.



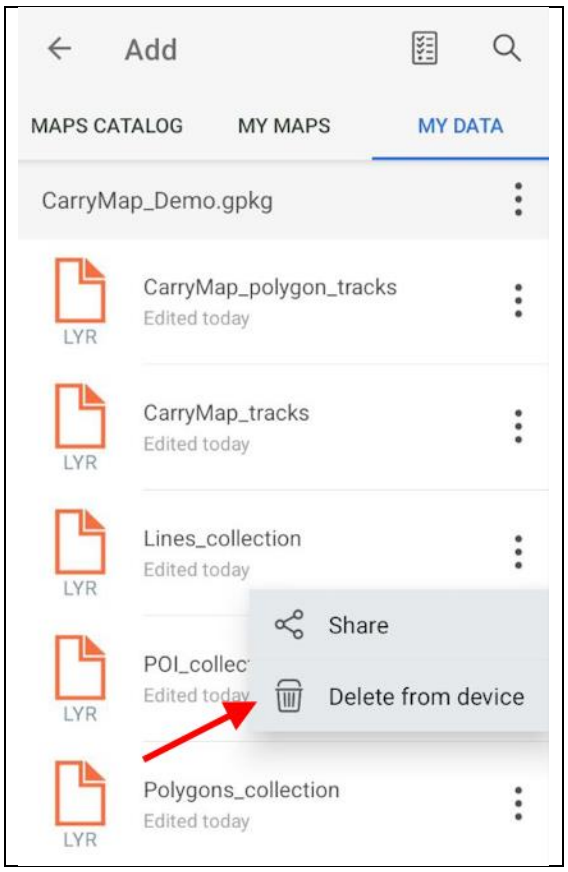
To zoom to all layer in the project, tap *Zoom to map* button in the Main menu.



To delete layer from the current project, tap three dots menu and select *Delete*.



To delete layer from the device, go to the *My data* tab and select *Delete from device* by tapping the three dots menu of the layer you want to delete.

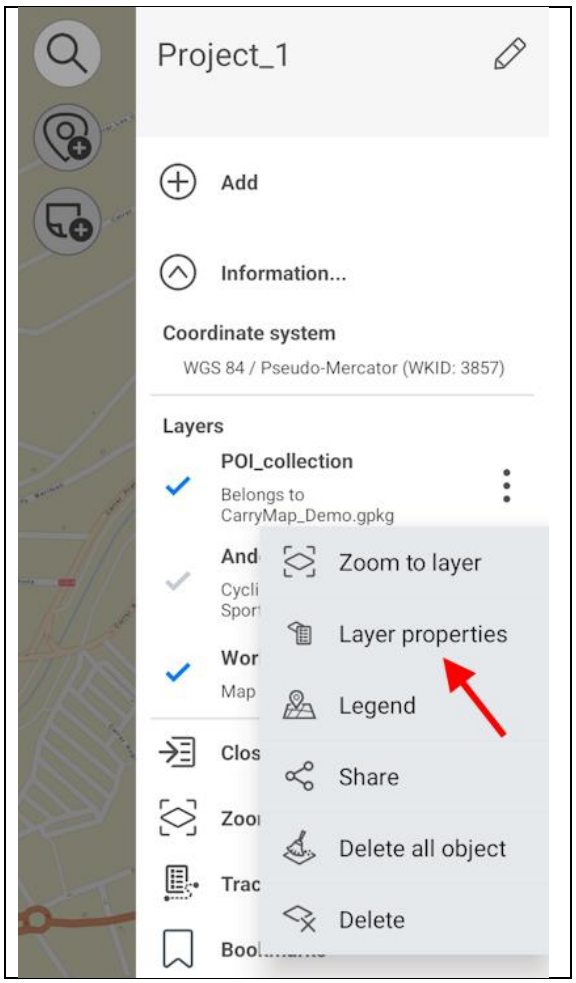


The layer will be deleted from the device.

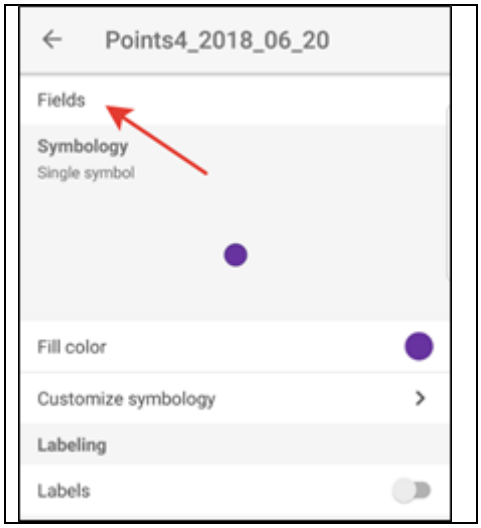
NOTE: Data and maps deleted from the device cannot be restored.

Changing layer settings

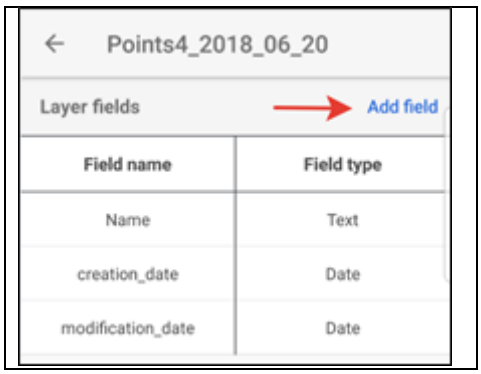
To go to the GeoPackage layer settings, select the *Layer properties* by tapping three dots.



To add fields to the layer attributes, tap the *Fields* section.



In the appeared window tap *Add field* button.

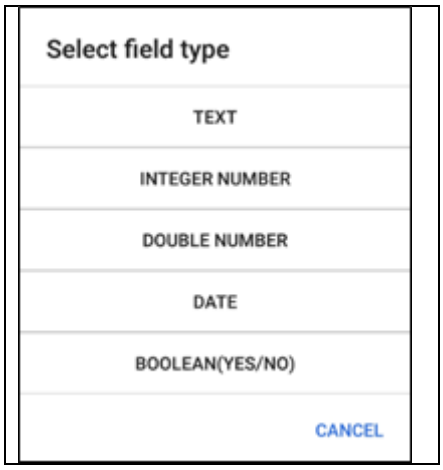


In the appeared field 

tap the *Field name* line and enter the name of the new field, then tap OK.



Now tap the *Field type* line and select the required field type from the list.



To delete created field, tap *Delete* . To save made changes, tap *Save* in the upper part of the window.

To change the object fill color, select *Fill color* in the *Layer properties* menu.



In the appeared list select the required color and all features will be changed accordingly.



To change properties of the layer symbology, select *Customize symbology.*

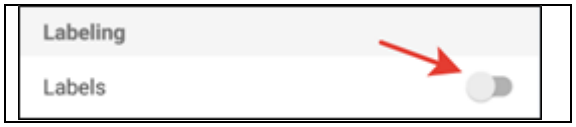


With the *Customize symbology* option you can change the symbol shape, size, show/hide its border and select border color, set transparency. To change symbol shape, tap *Shape* and select the required shape from the appeared list.



To select image as symbol, tap  and select the required image from the Gallery.

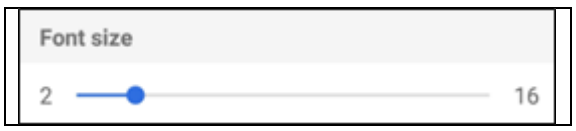
To show labels for features, pull the switch in the *Labeling* section to display labels.



In *Label field* line select the field which attributes will be used to label all features.



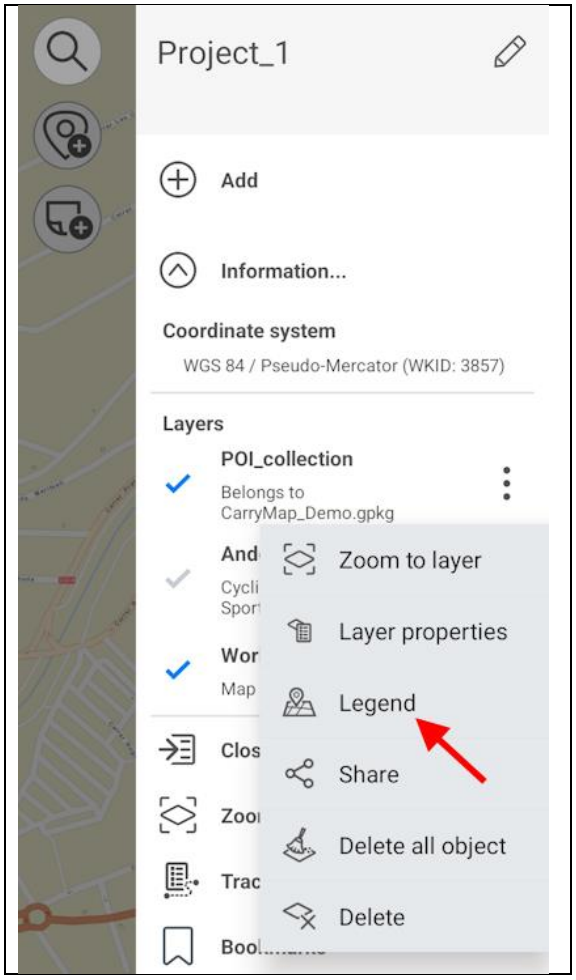
In the *Font size* line specify the font size pulling the shift to the required value.



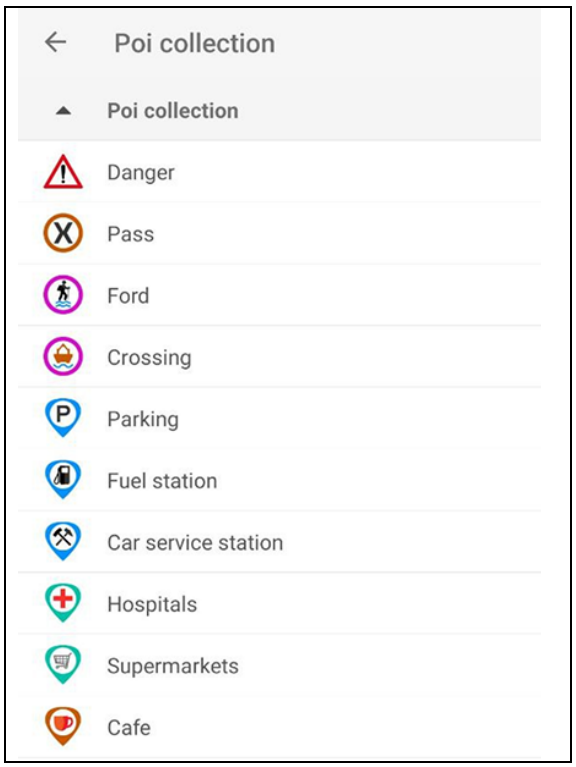
Select the labels color in the *Font color* line.



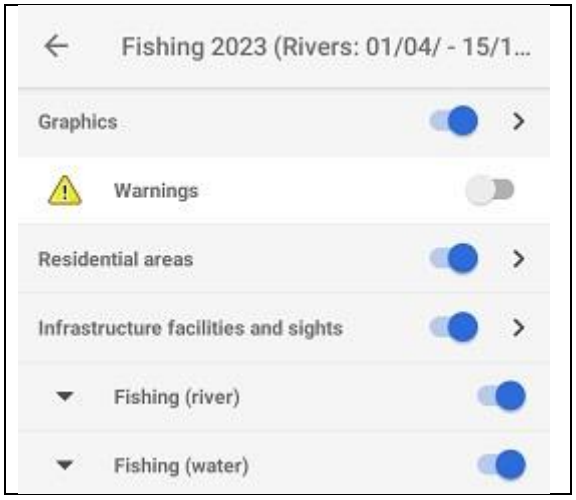
To view symbology used for layer, tap three dots, and select *Legend* in the menu.



In the appeared window you can view all symbology used to display this layer. To turn the layer off, pull the layer visibility shift.



It is also possible to change the visibility of layers individually. To turn the layer off, tap three dots and select Legend in the menu and pull the layer visibility switch.



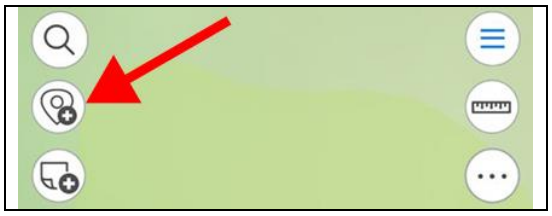
Section 4. Creating and editing features

About GeoPackage

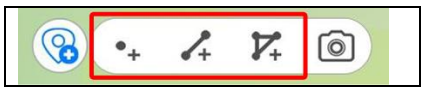
GeoPackage (GPKG) is an open geospatial data format that is not associated with the operating system and is implemented in the SQLite database container format. The format is widely used among professional cartographers due to a number of its advantages. In comparison with the SHP format files, GeoPackage can contain a lot more features (about 100 million), but at the same time it remains as light as possible, and unlike the GPX format, which transmits only lines and points, GeoPackage can transmit all types of mapped features (points, lines, polygons), as well as attachments to them in a single file.

Creating new features

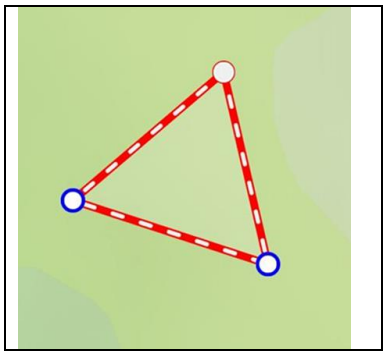
To create new feature on the map, tap the *Create feature* button.



In the appeared menu select the feature type: point, polyline, or polygon.

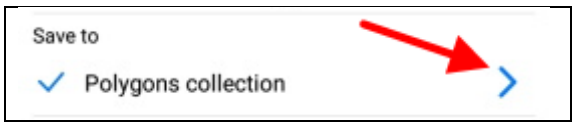


Specify the feature geometry. To do so, consequentially tap the required places on your map.



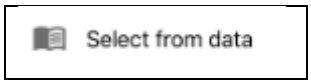
To delete the needless point on the map, tap it. To add the new point, pull the edge in the needed place and the point will be added there. To change location of the created point, tap and hold it, then drag it to the new place on the map.

Now select the layer where you want to create the new feature. To do so, in the feature card tap the arrow near the *Save to* option.



In the appeared window you can either select the layer from the currently opened project, or select the previously created layer in the application, or create the new layer.

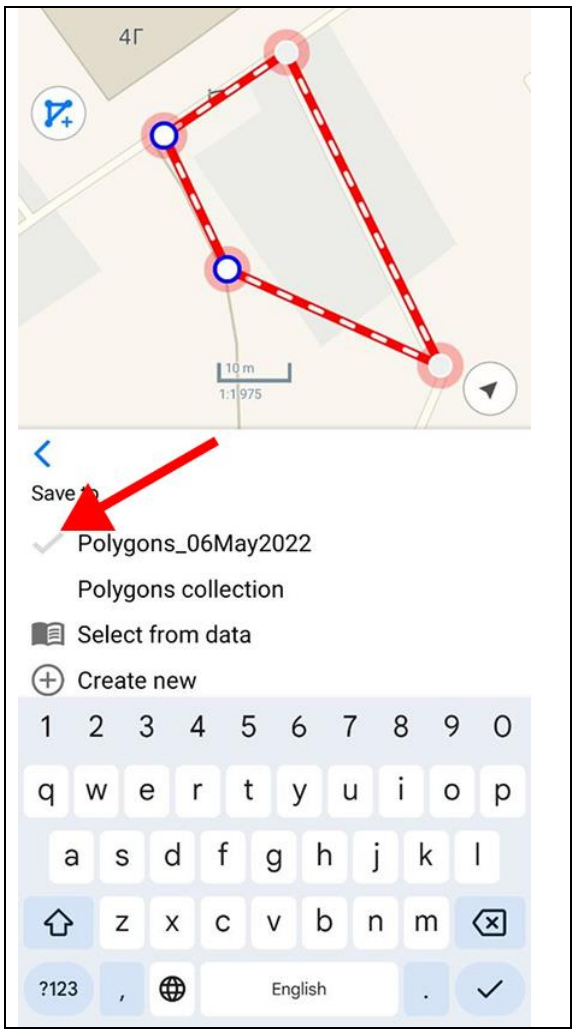
To select the layer from the existing data, press *Select from data* and select the required layer from the list of GPKG layers stored in the application.



To create the new layer, press *Create new*.

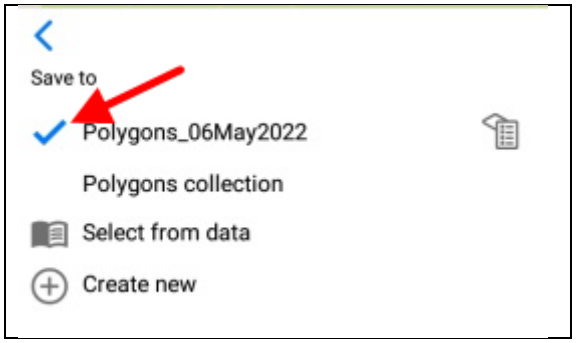


The layer will be automatically created with the default name, but you can rename it, to do so, enter the new name using the keyboard.

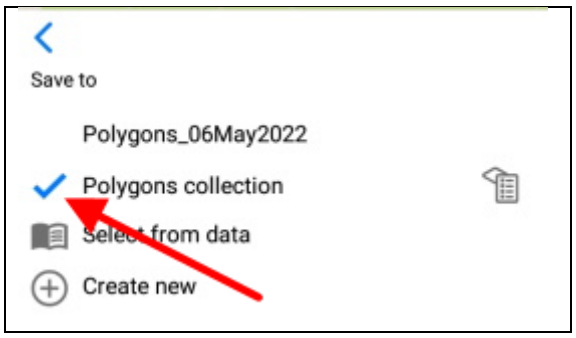


To confirm the layer name, tap the tick mark near the layer or tap *Enter* on the keyboard.

If there are previously added layers in the project, then to create the feature you need to select the required layer from the list. The selected layer will be marked with the check sign.

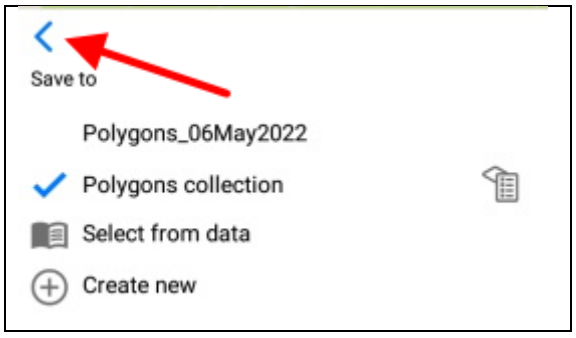


To select another layer, press its name in the list and it will be marked with the blue check sign.

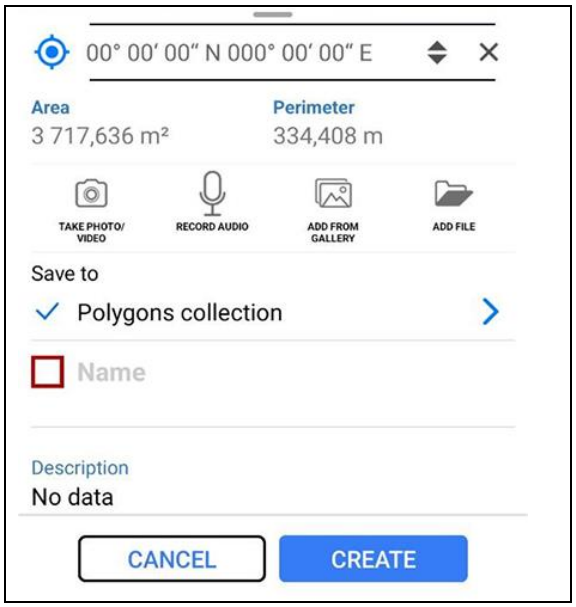


To go to changing parameters of the layer settings, press . See *Changing layer settings* section for more details about changing layer settings.

To go to saving the created feature and filling in the fields, press the back arrow.



To fill in the *Name* and *Description* fields, tap the required line and enter the text.

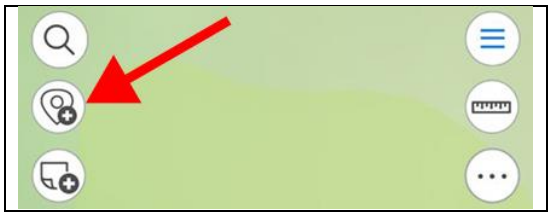


To complete creation of the feature, press *Create*. The feature will be saved. If you need to cancel this operation during the feature creation process, press *Cancel*.

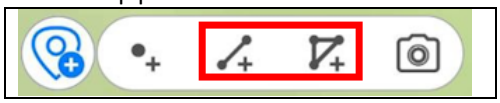
Creating features using freehand line

To create a new polyline or polygon feature on the map by drawing the freehand line, go to *Application settings* of the map menu. In the *Method of creating polylines and polygons* section select *Freehand line*.

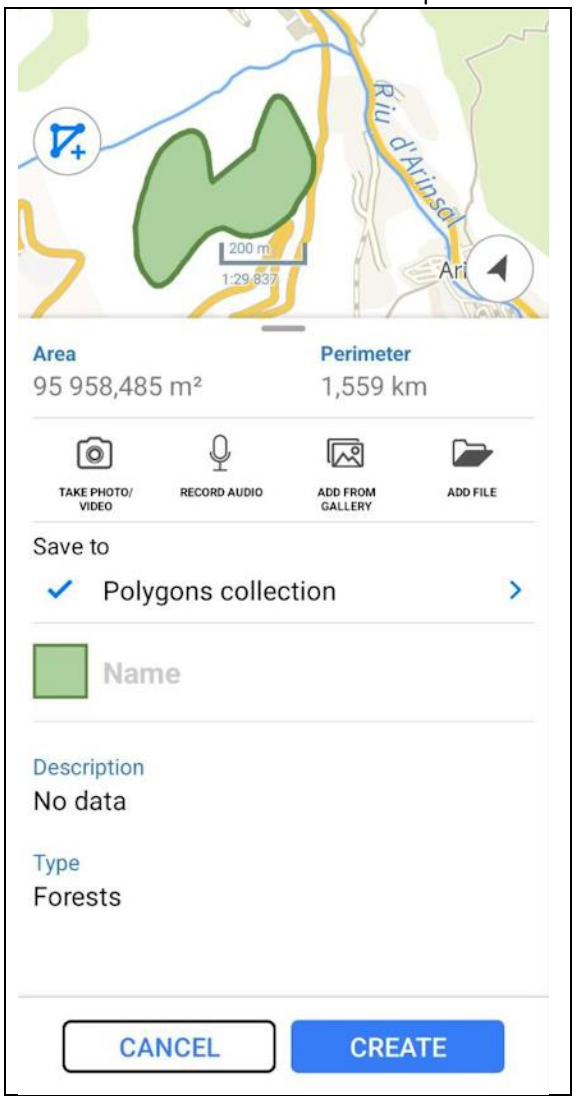
Tap the *Create feature* button.



In the appeared menu select the feature type: polyline or polygon.



Draw the feature on the map.



To complete creation of the feature, press *Create*. The feature will be saved. If you need to cancel this operation during the feature creation process, press *Cancel*.

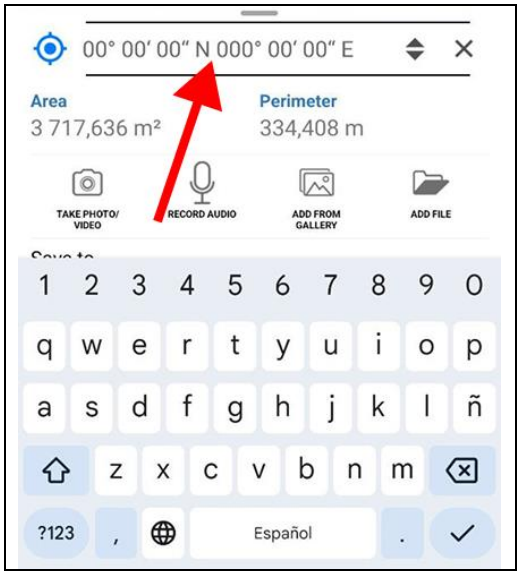
Creating features by coordinates

To create the feature by coordinates, during the creation process go to the line for entering coordinates in the feature identification card (see *Creating new features* section for details).

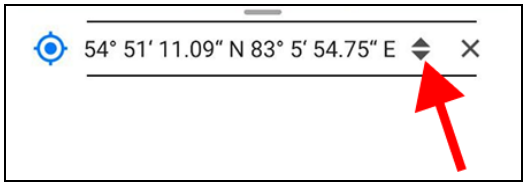
To create the feature by your current location, press *Coordinates by location* button in the identification card of the created feature.

Coordinates of the point feature will be changed to coordinates of the current location. The new point with coordinates of your current location will be added to the created polygon or polyline feature.

To add the feature by manually entered coordinates, go to the line for entering coordinates.



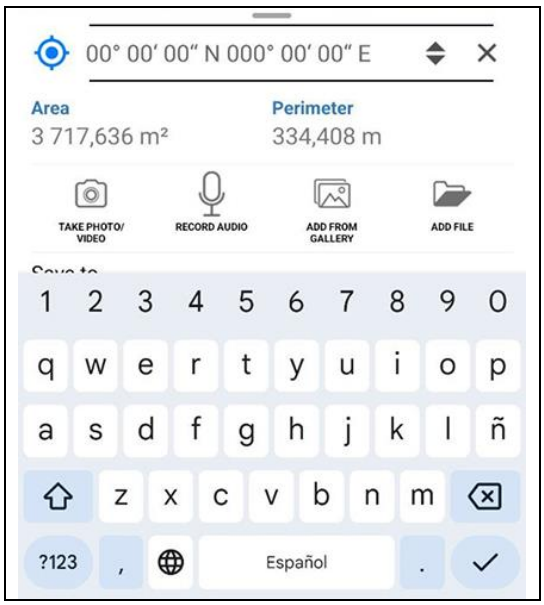
You can change coordinates format, if needed. To do so, select the feature and in the appeared identification window tap the line with coordinates to change the format.



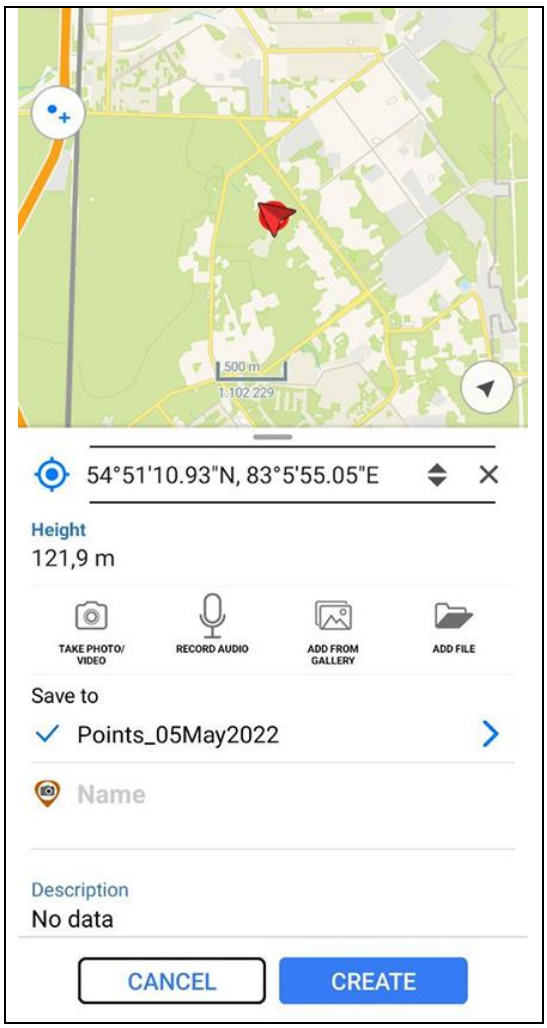
The available coordinate formats are as following:

- Degrees-minutes-seconds;
- Decimal degrees;
- UTM meters (if you selected Projected coordinate system in Settings, see *Application settings* section for details).

Enter the required coordinates and press *Return* on the keyboard.



The point with the specified coordinates will be added on the map.



To save the point, press *Create*.

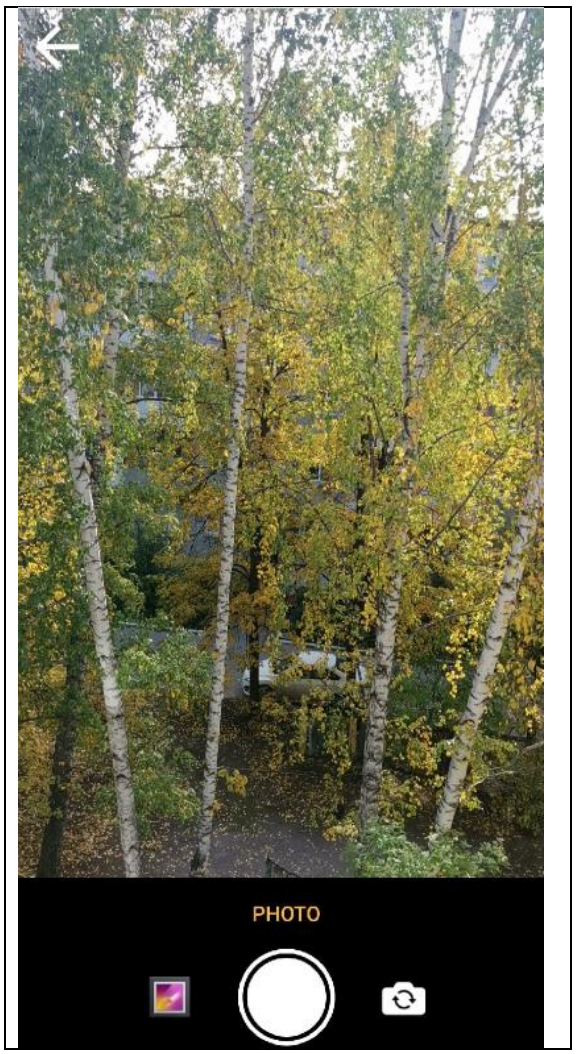
Creating point feature by photo

To create the new point feature by photo, press *Create feature* button in the map window and in the appeared menu select *Create point by photo* button.

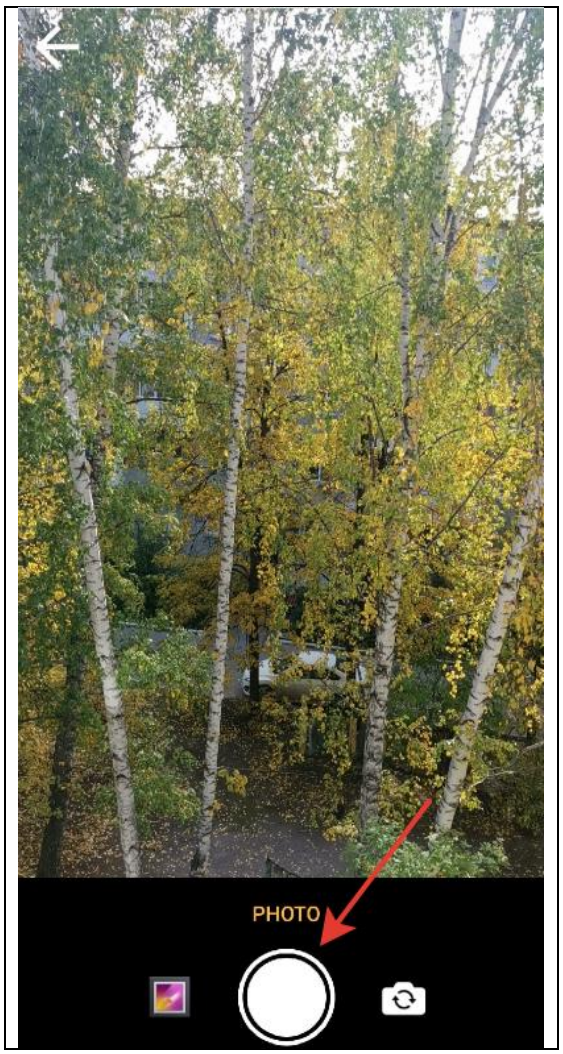


NOTE: To be able to use this option, in your smartphone settings you need to allow CarryMap app to have access to the device camera and memory (see *Application permissions*). Besides, for all photos made with your device, the option of using geolocation should be enabled.

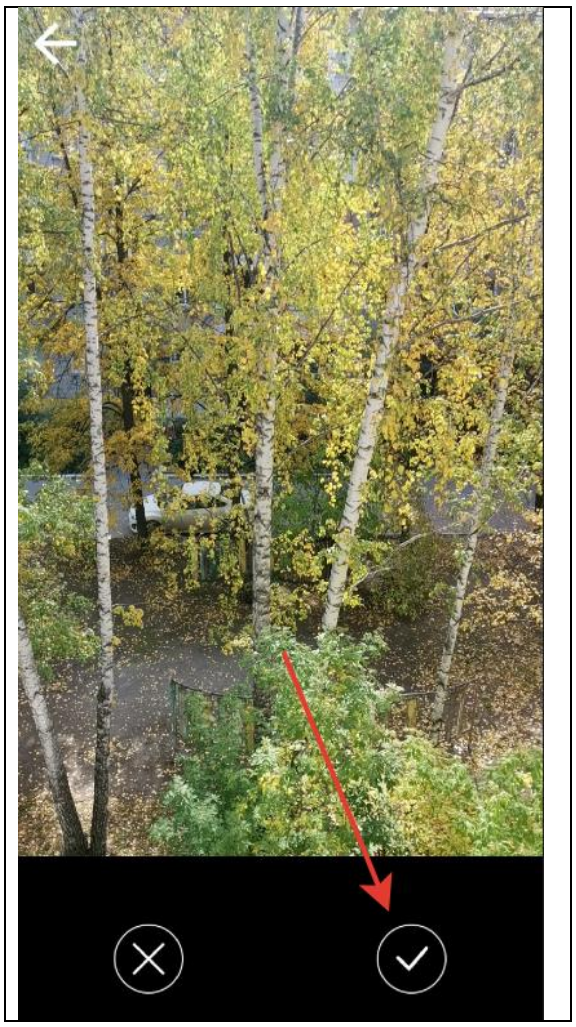
After pressing the *Create point by photo* button the camera window will open.



Press *Take photo* button.

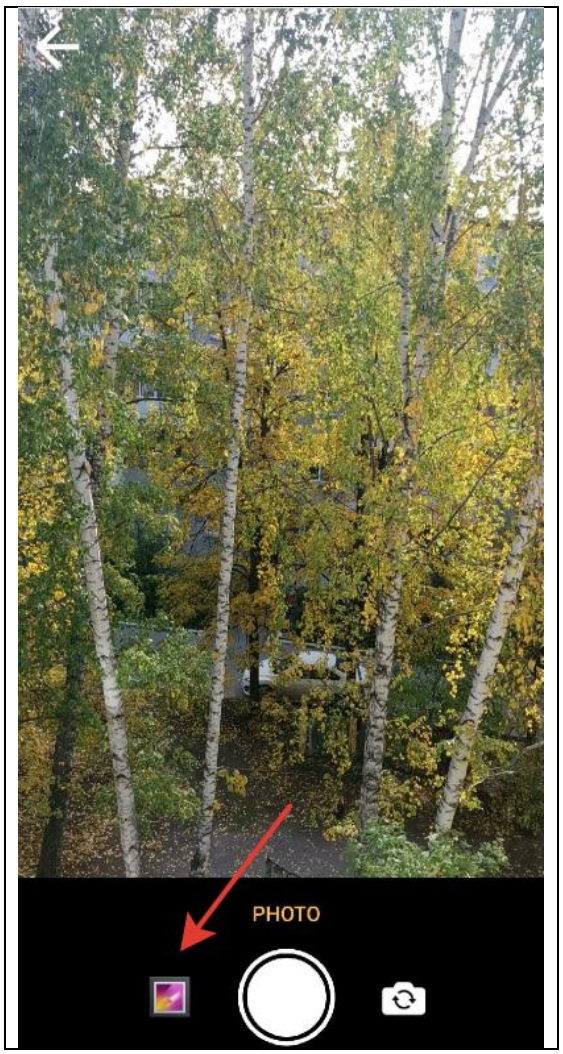


To use this photo, press *Use photo*.

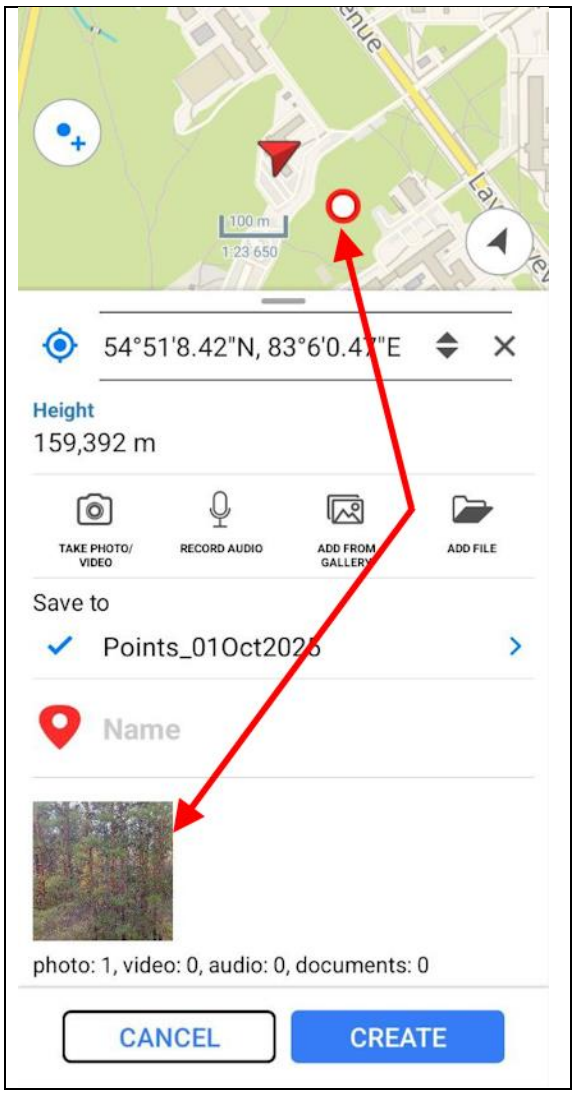


To take another photo, press *Retake*. In the appeared camera window take the new photo and press *Use photo* again.

To use the existing photo, press *Gallery*.



Select the required photo from your Gallery. Now coordinates of selected photo will be used to create the point on your map and this photo will be added as attachment to the point (see *Adding attachments to feature*).



Changing the layer and its settings is done same as when creating features, see *Changing layer settings* section for details.

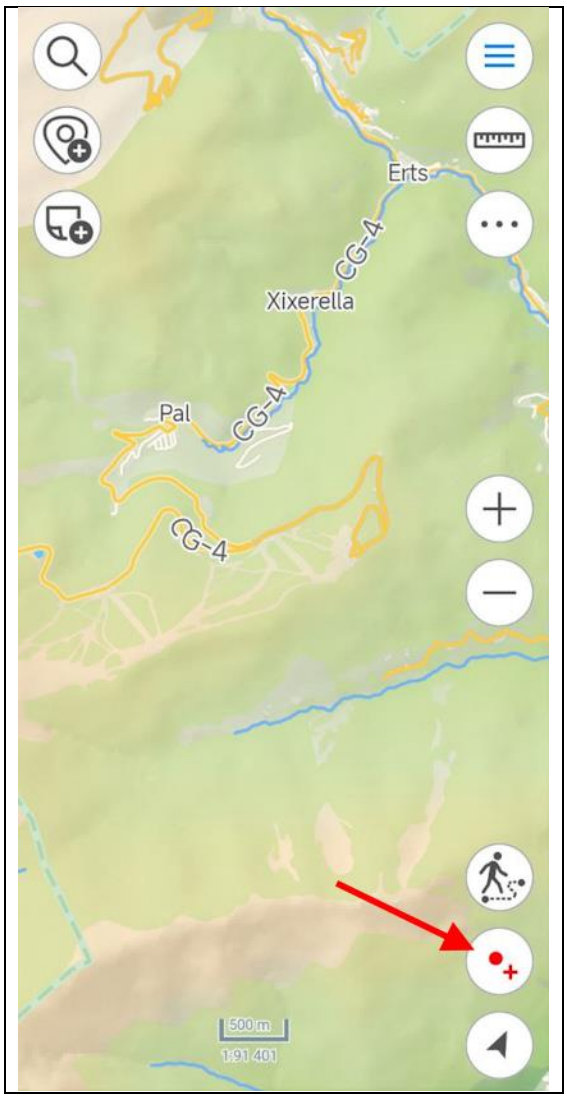
To complete creation of point by photo, press *Create* button.

To cancel creation of point by photo, press *Cancel* button.

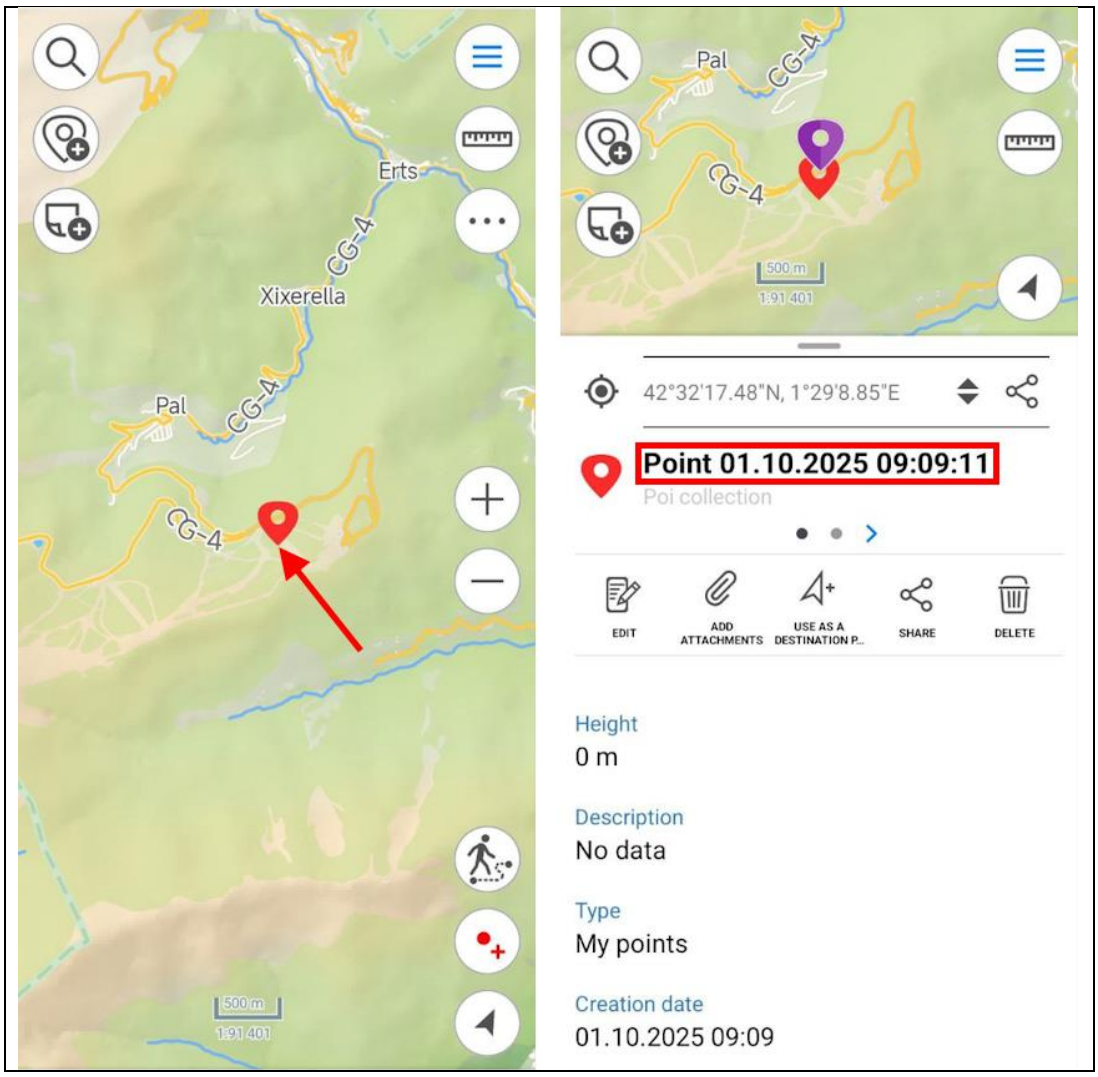
Creating points with single tap*

*Note that you can create a point feature on the map with a single tap using the *Save point* command in the app on your Wear OS.

You can create a new point feature on the map with a single tap. To do so, tap the quick action button *Save a point*.



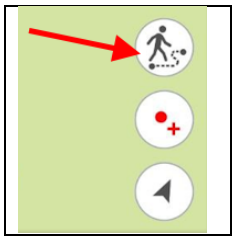
The new point feature will be created on the map. The point name is filled in automatically and contains the object's creation date and time.



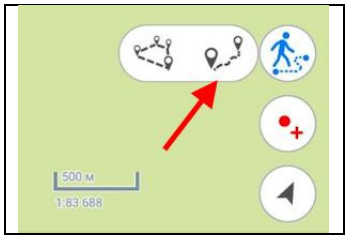
Recording track*

*Note that you can start and finish recording track and creating polygon by track processes using the *Record track* command in the app on your Wear OS.

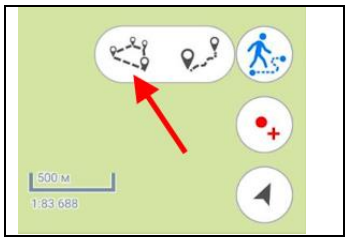
To start recording track, tap .



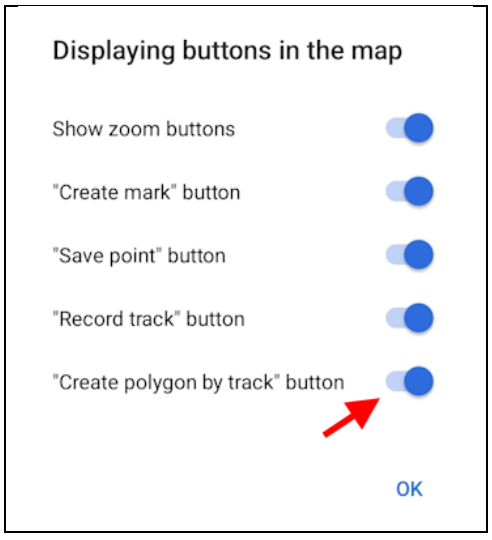
If in the *Application settings* the display of the *Create polygon by track* button in the map window is enabled, then to record a track, tap  and select *Record track* in the appeared menu.



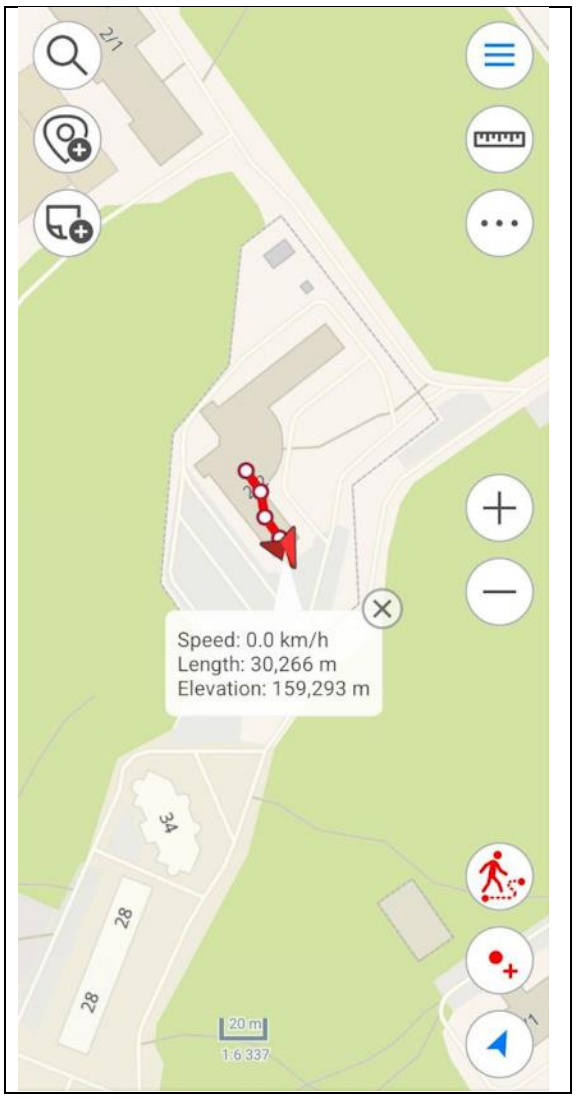
To create polygon by track, tap . In the appeared menu select *Create polygon by track*.



Note, that the *Create polygon by track* button is not available in the map window by default.
To add the *Create polygon by track* button to the map window, go to *Application settings* and change the switch position in the appropriate section.

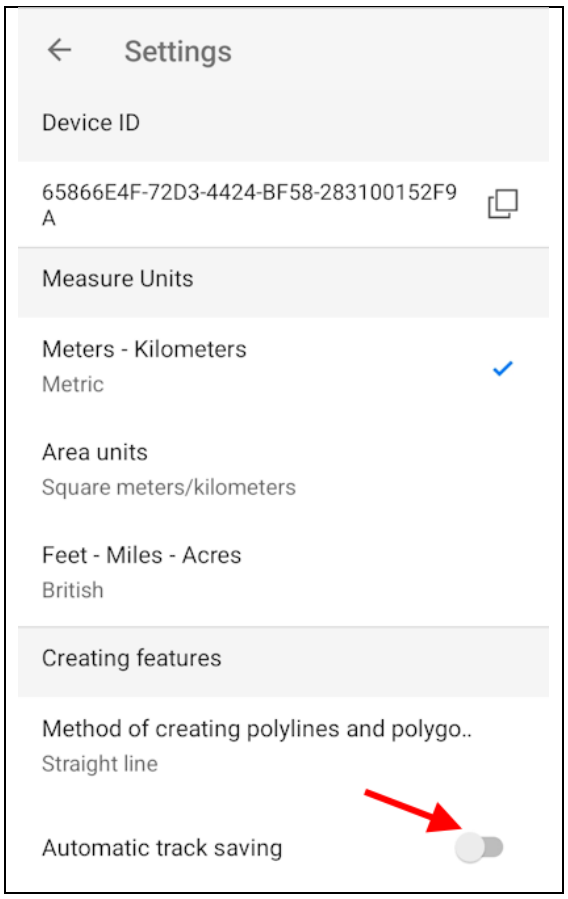


When recording track or creating polygon by track starts, the tool button becomes red.

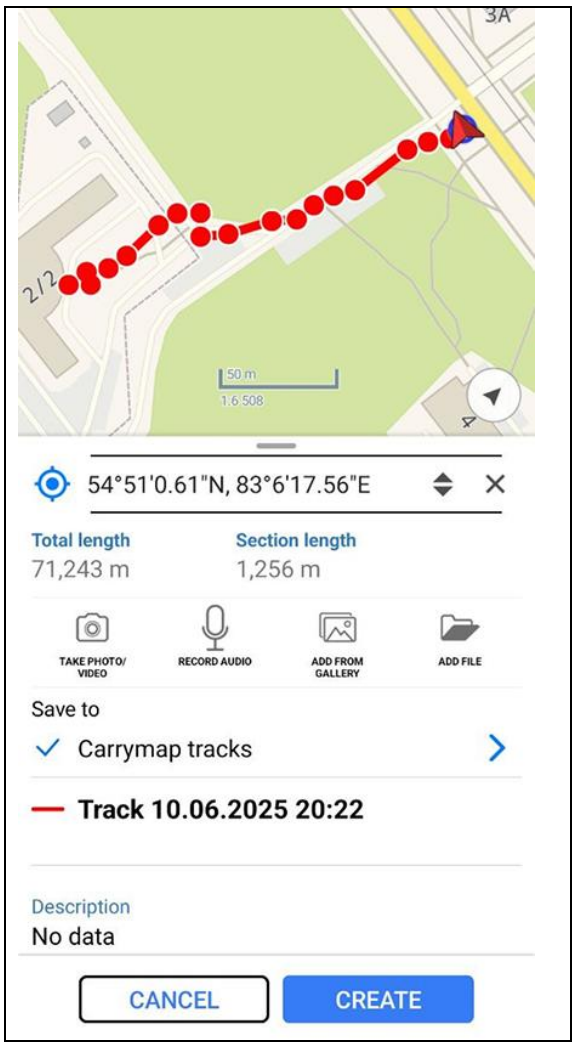


To complete recording track or creating polygon by track, press the tool button again.

Note, that in the *Application settings* you can disable automatic track saving after stopping recording.



In this case, after completing recording track or creating polygon by track, in the appeared window select the layer where you want to save your track or polygon. Enter the track name in the *Name* field, if needed.



Note that every 5 seconds your track will be saved automatically. That is, even if your device switches off by some reason, the track will be automatically saved to the selected layer and so will not be lost.

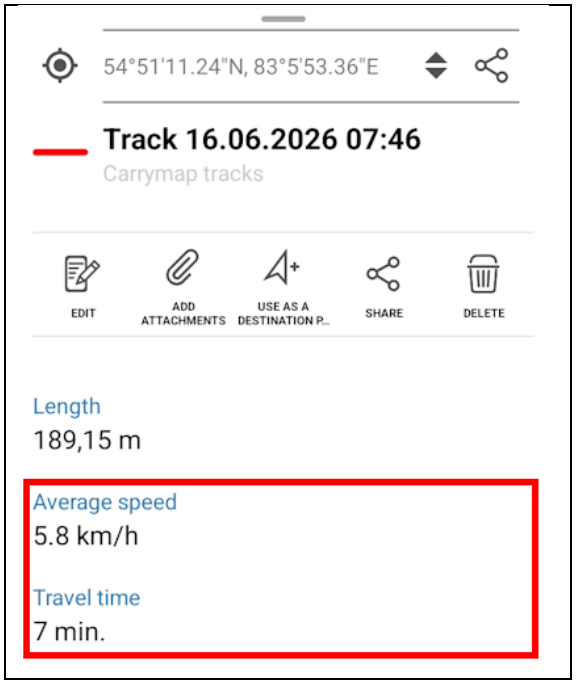
Note that recording track does not hinder any other operations provided with the app (for example, feature creation or editing, adding new layers to project, etc.).

NOTE:
For the track recording function to work correctly and create polygons by tracks, we recommend that you provide the application access to your location in any mode (including in the background), otherwise the application will not be able to receive data about your location in the background, and the track line will be built incorrectly (see *Configuring the system settings* and *Application permissions*).

All tracks are automatically recorded by the app in the tracks log. There you can find and restore your track if necessary (see *Track log*).

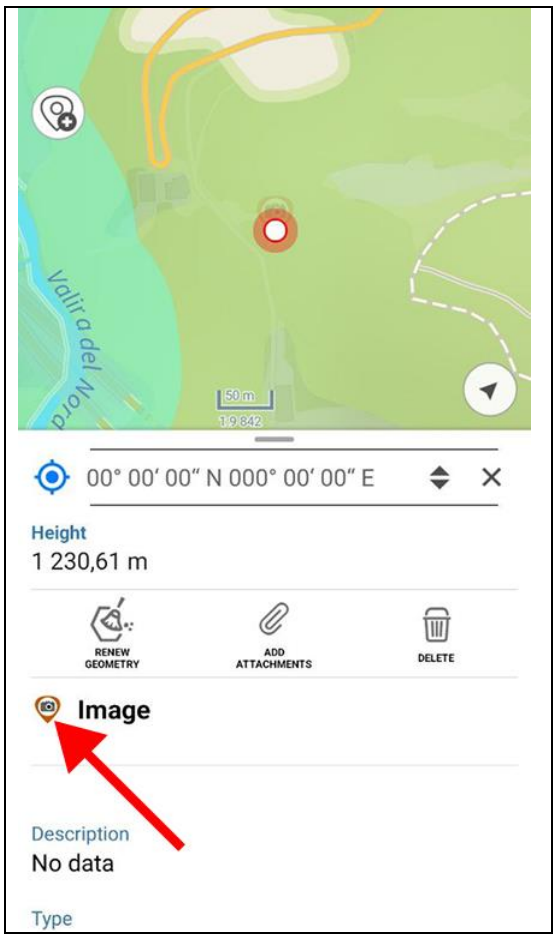
Viewing information about your average speed and travel time

Information about your average speed and travel time is displayed in the additional virtual fields *Average speed* and *Travel time* in the track identification card.

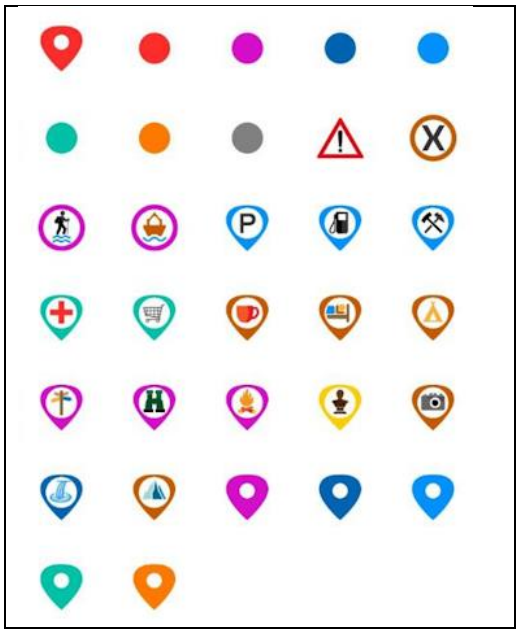


Selecting symbol when creating feature

When creating the feature in the existent or the newly created layer you can specify different symbols for features of one layer. To do so, create the new feature and select the required symbol in the feature card.



In the appeared list select the required symbol.

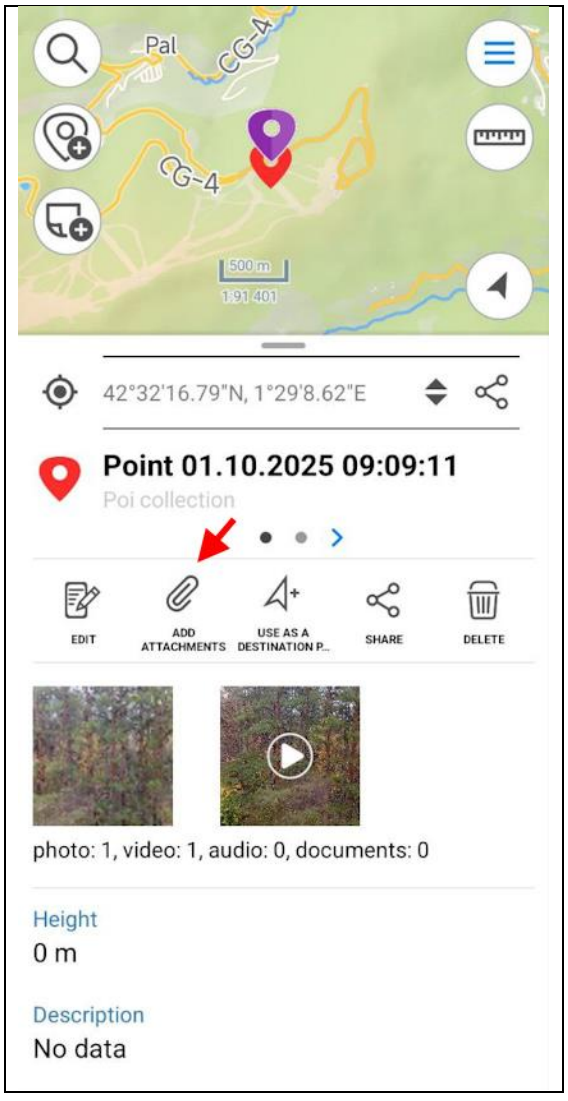


Tap *Save*.

Changing symbology for the feature is also possible when editing mode is on (see *Editing features*).

Adding attachments to feature

You can add attachments to any feature on the map. To do so, in the feature card tap *Add attachments*.

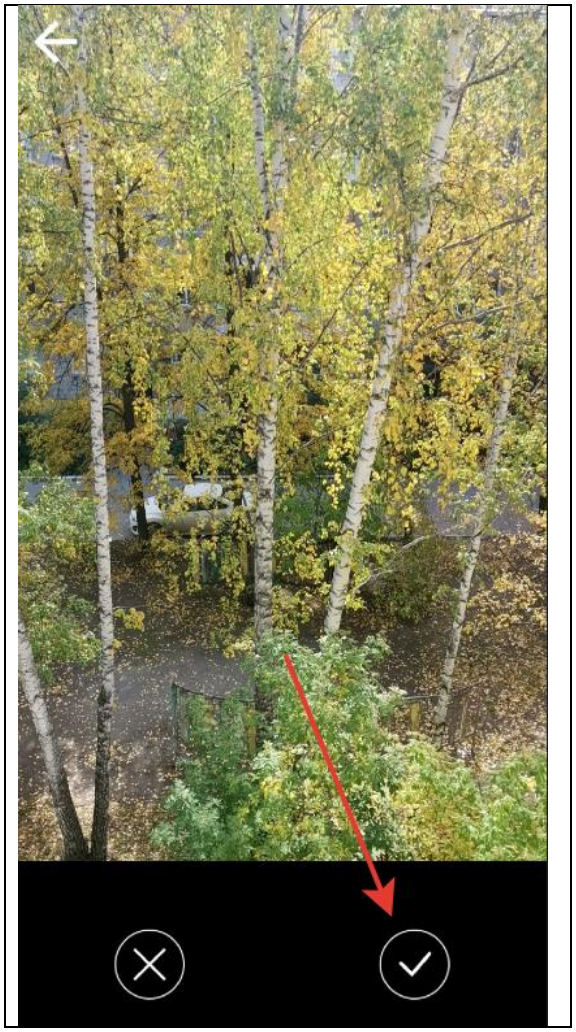


To add photo or video, tap *Take photo/video*.

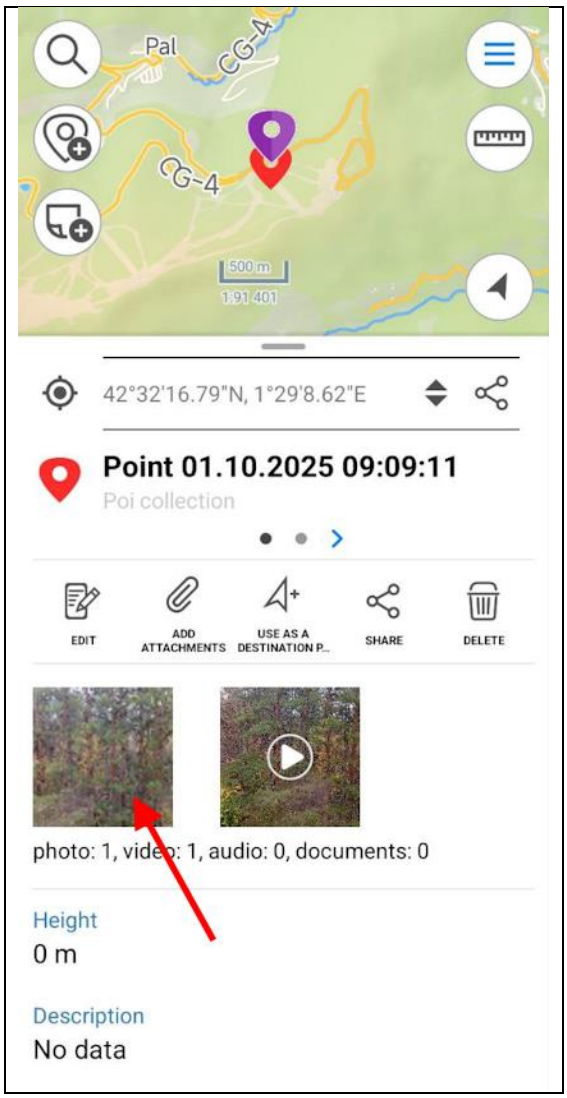


To be able to use this option, in your smartphone settings you need to allow CarryMap app to have access to the device camera and memory (see *Application permissions*).

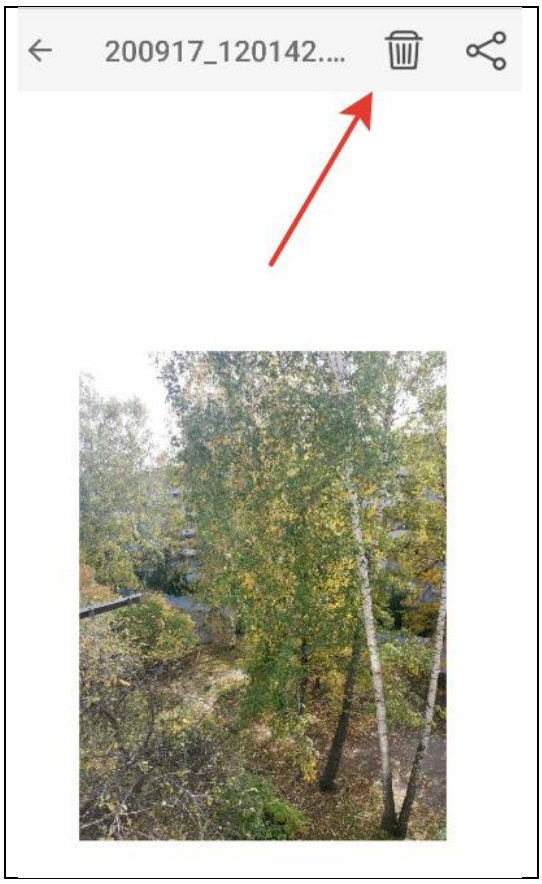
Take a photo or video and tap *Use photo*, to add it as attachment to the feature.



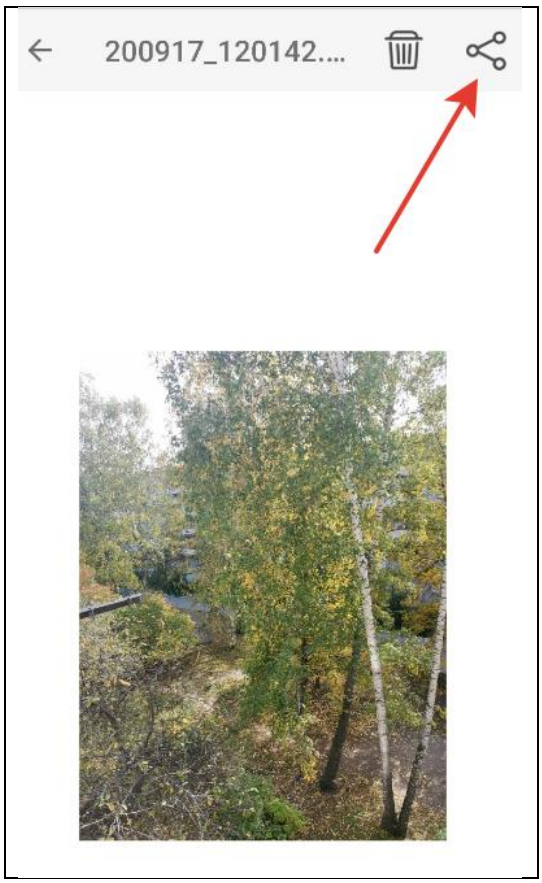
Added photos can be viewed in the feature's card. To open the photo, tap the appropriate thumbnail.



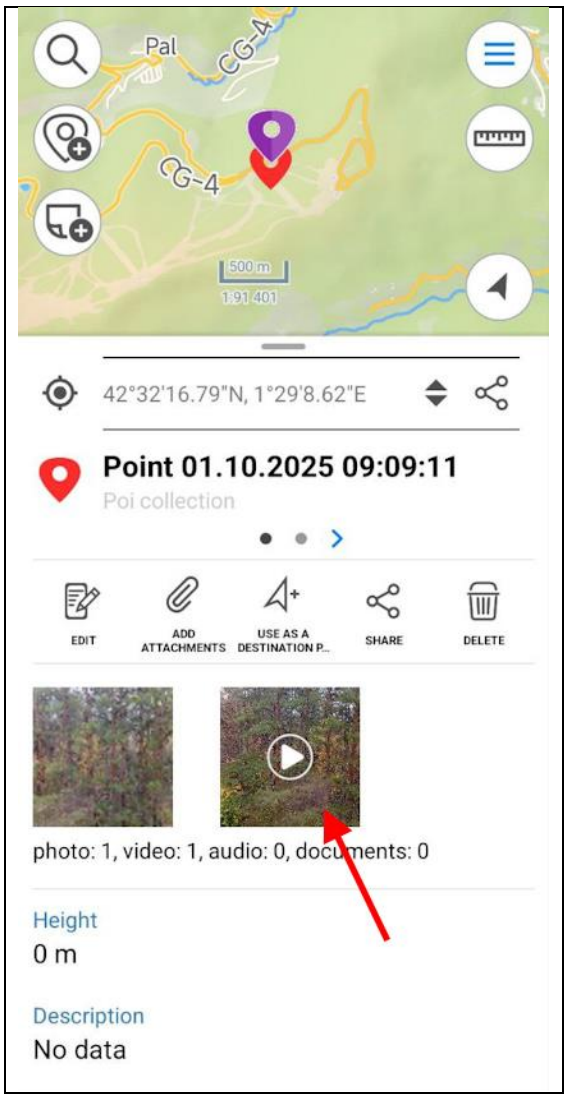
To delete the added photo, tap *Delete*.



To share/send the added photo, tap *Share*.



Added videos can be viewed in the *Files* section of the feature's card. To view or delete the video, select it in the card and select the required option.

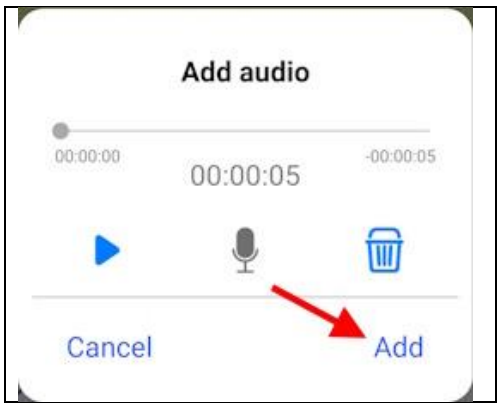


To add audio, tap *Record audio*.



To be able to use this option, in your smartphone settings you need to allow CarryMap app to have access to the device microphone (see *Application permissions*).

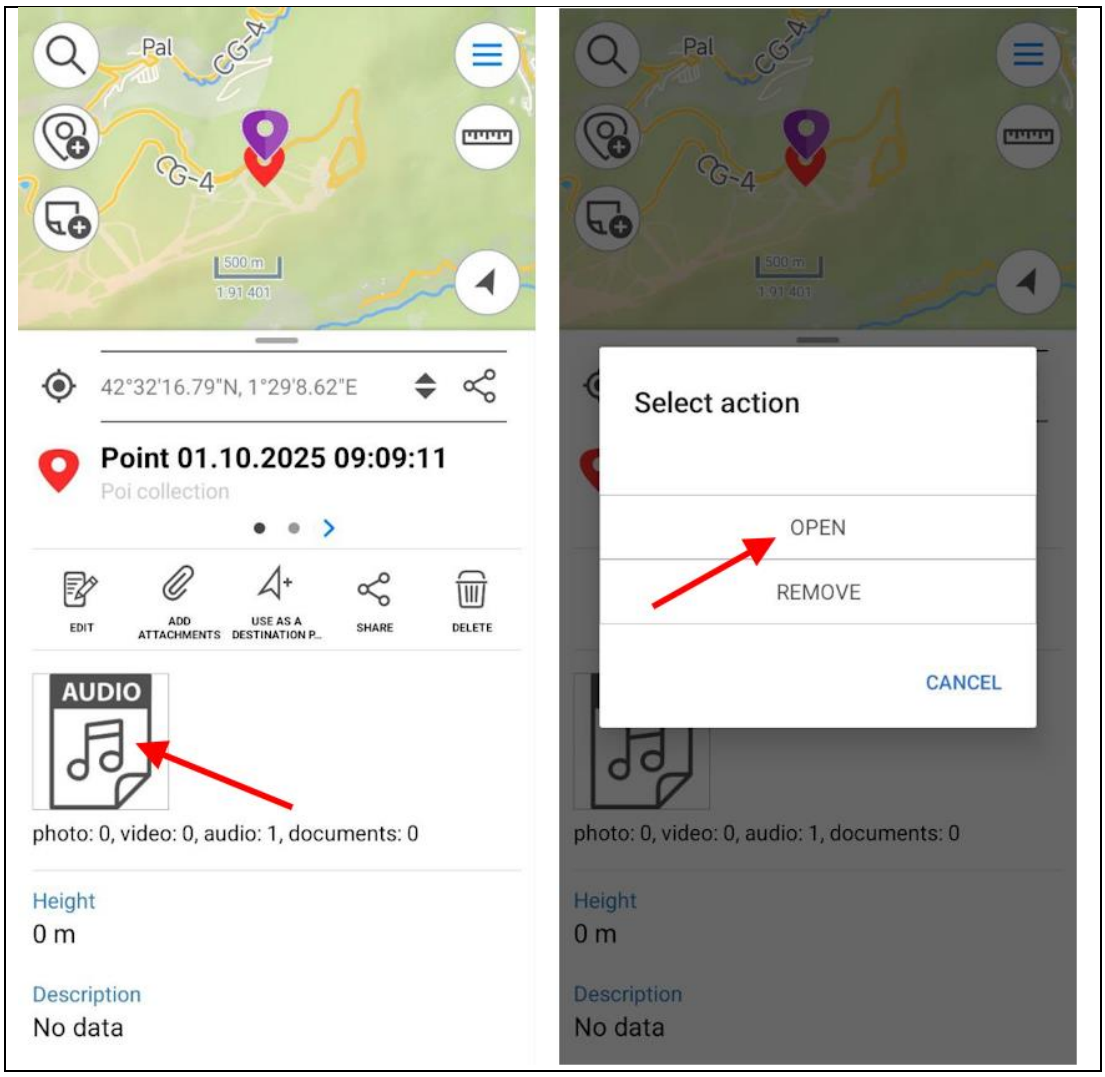
Record audio and tap *Add*, to add it as attachment to the feature.



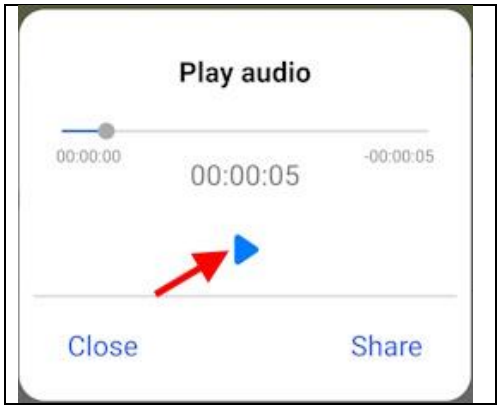
To play recorded audio, press the button.

To delete recorded audio, click the button.

Added audio can be played in the application. To play the audio, tap the appropriate thumbnail in the feature card and select *Open*.



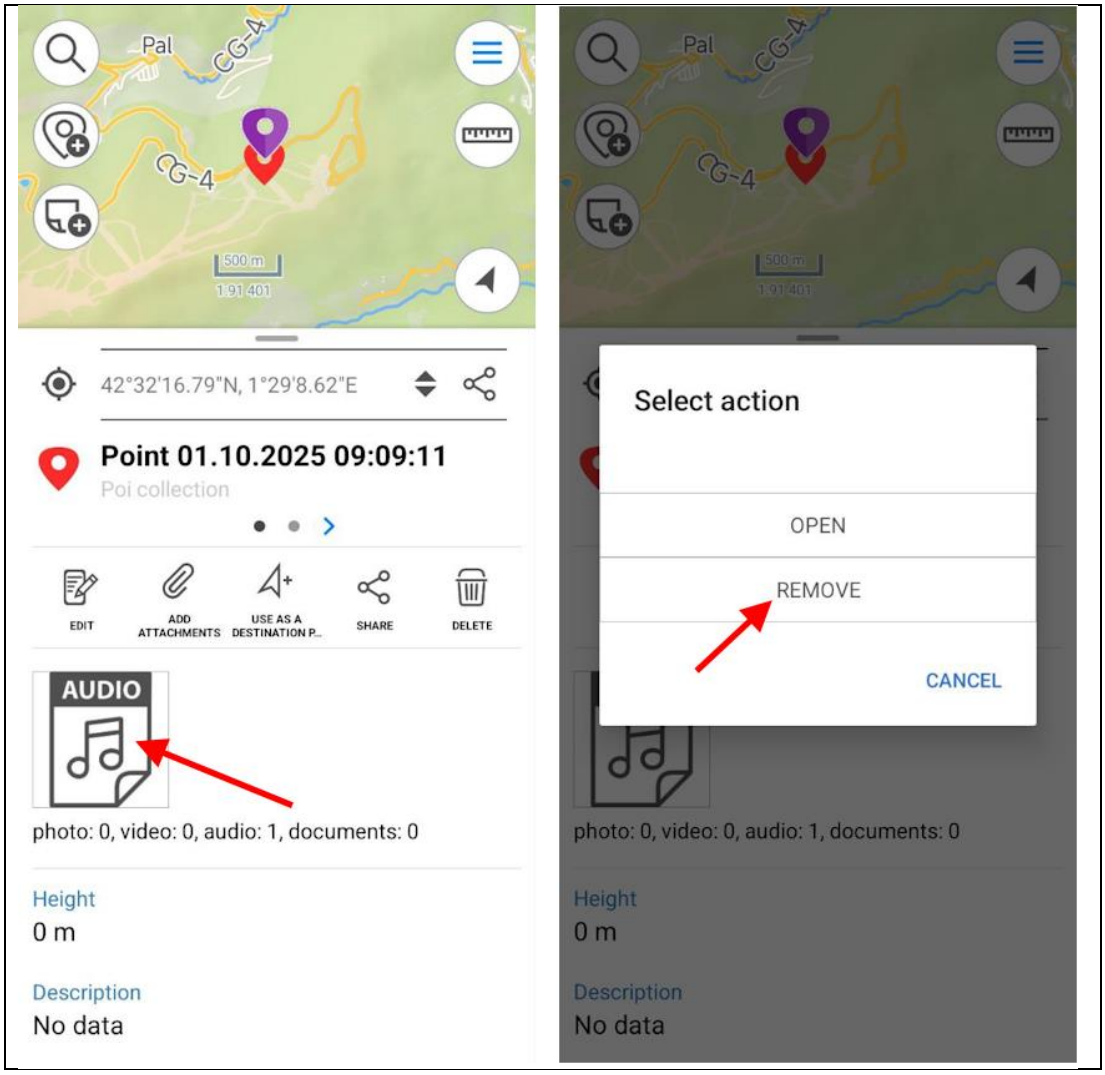
In the appeared window, start playing audio.



To share/send the added audio, tap *Share*.



To delete the added audio, tap the appropriate thumbnail in the feature card and select *Remove*.



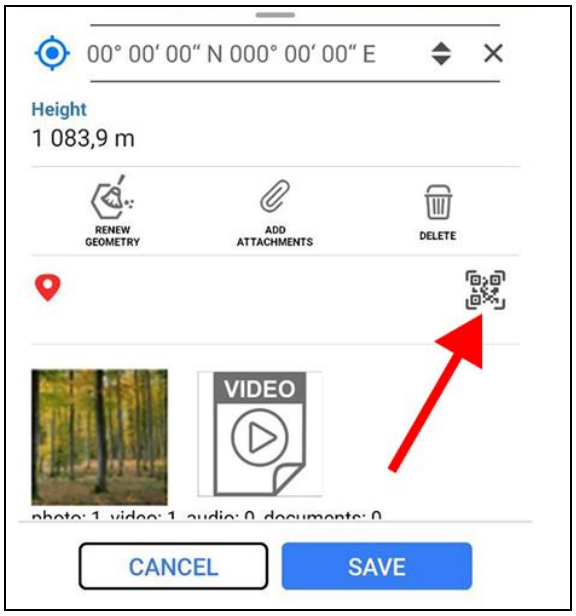
To add the media file from the gallery that is already on the device, tap *Add from gallery*, to add the document, tap *Add file*.



Filling in fields using QR code

To make it easier to add complex, voluminous information to the fields of the object card, you can use a QR code. This data entry feature is available for text and numeric fields when creating or editing an object.

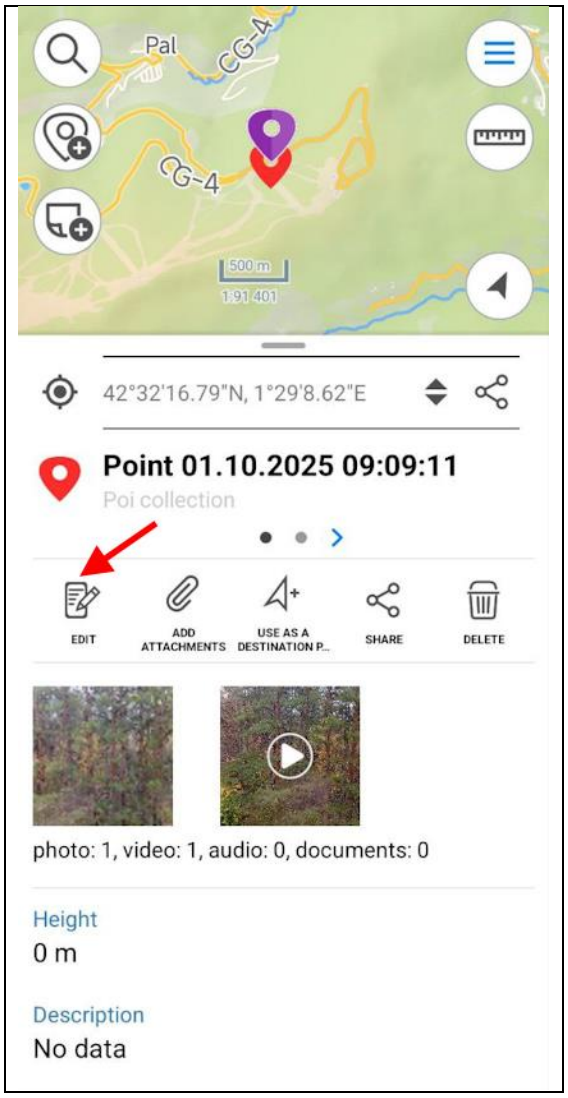
Access to the QR code scanning capability appears automatically when you click on the needed field in the object creation or editing mode.



NOTE: In order to be able to use the option of filling in fields using QR code, the CarryMap application should be allowed to access the camera and the device memory (see *Application permissions*).

Editing features

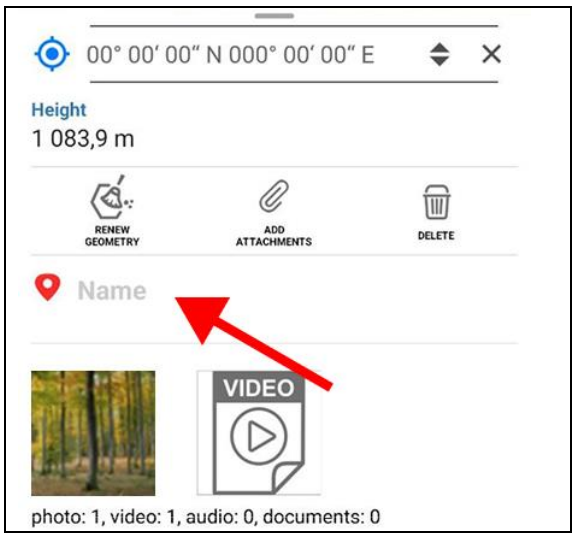
To start editing feature, select it on map or find it searching by attribute or coordinates (see *Searching features* section for details) and tap *Edit* icon in the feature identification card.



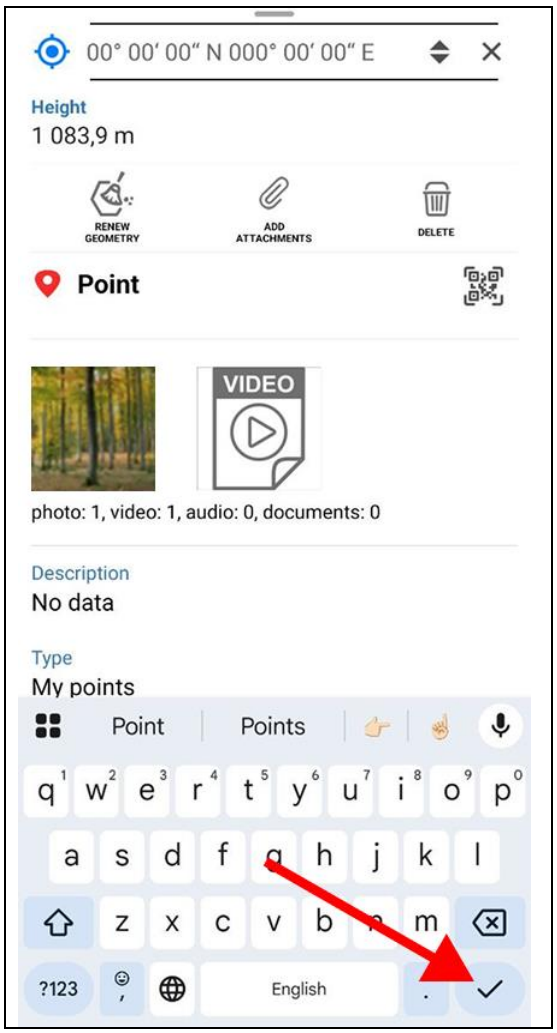
Being in the feature editing mode, you can change the feature geometry. To delete the point, tap it on the map. To add the new point, tap the empty place on the map or use the opportunity to create the vertex by coordinates (see *Creating features by coordinates*). To move the point, select it on the map and drag it to required place on the map.

To save your changes, tap *Save* SAVE. To cancel made changes, tap *Cancel* CANCEL.

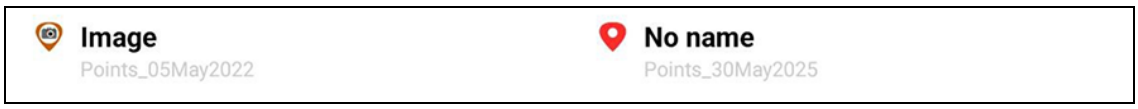
To change the feature name, enable the editing mode and select *Feature name* in the feature card.



Enter the feature name and tap *Done*.



If feature name has not been specified, the feature card will have the default name *No name*, but the default name will be changed right after you specify the name of this feature.



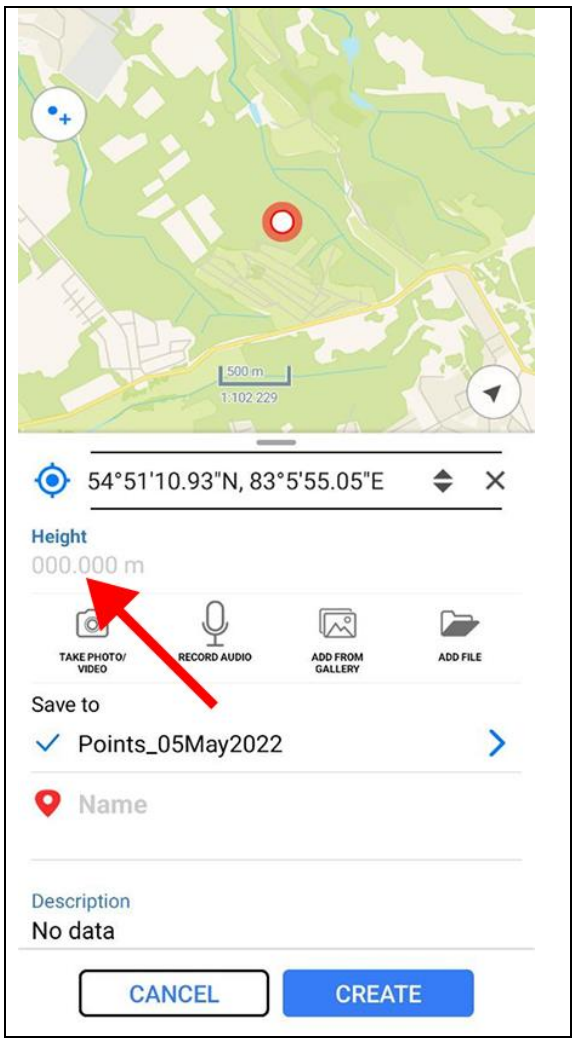
Adding and viewing Z coordinates

Adding Z coordinates to point features

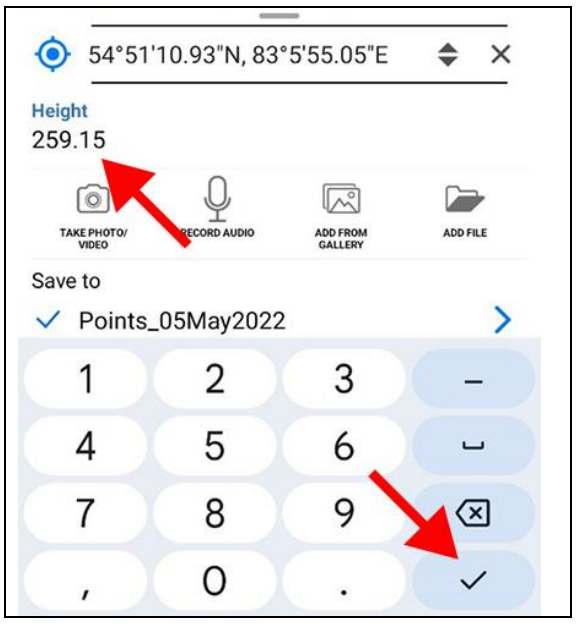
Adding Z coordinates (heights) to point features is available when creating and editing features on the map.

Note that adding and editing the Z coordinate values of point features is only available in GeoPackage layers that support storing information about the height of features.

To add or edit Z coordinate (height) value of a point feature, during the process of creating or editing feature go to the value entry line in the *Height* field of the feature identification card (see *Creating new features* and *Editing features* sections for details).

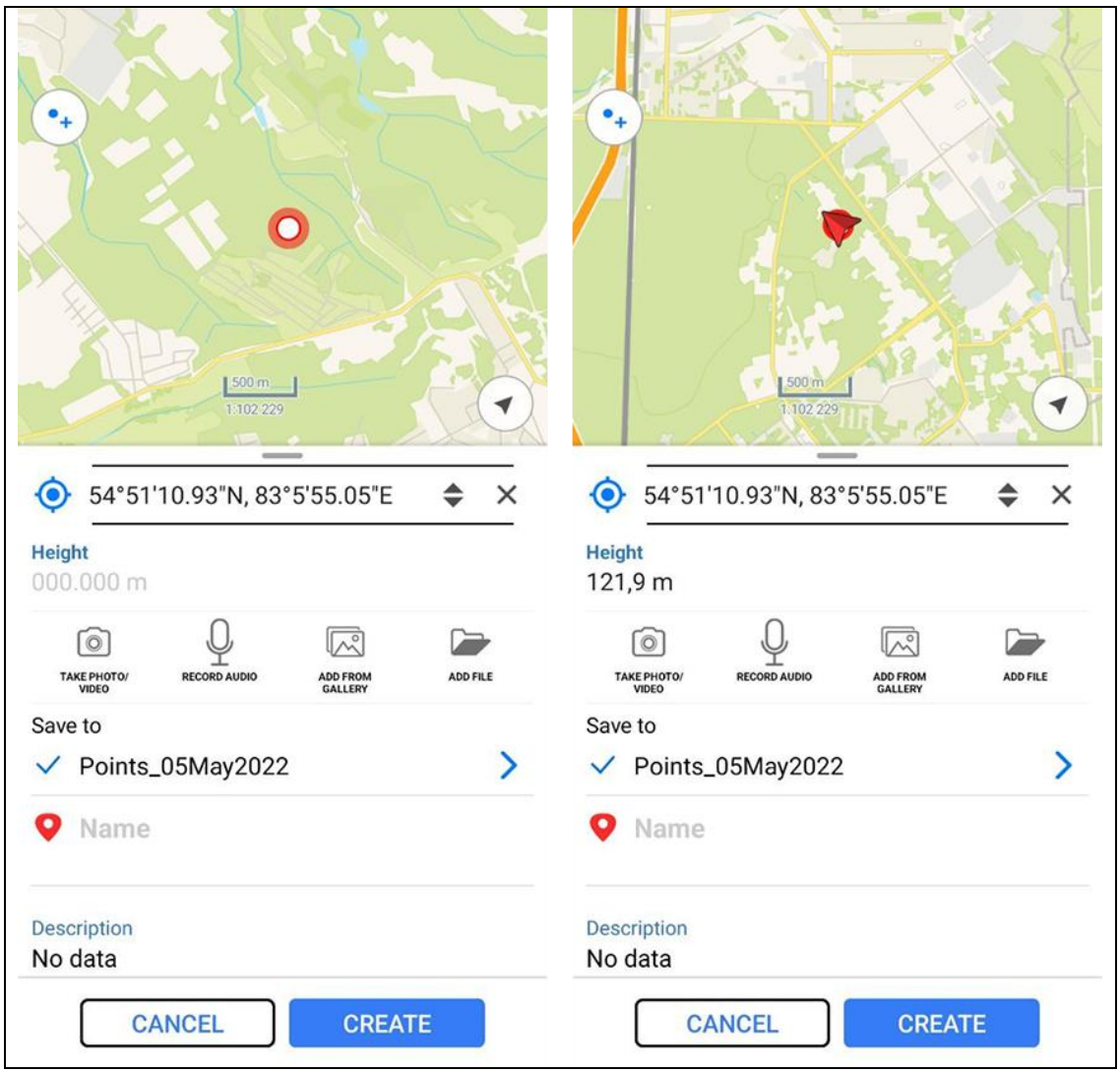


Enter the value and press *Done* on the keyboard.



To add Z coordinate (height) of a point feature from GPS module of the device, press *Coordinates by location* button.

The value in the *Height* field will be changed to Z coordinate value obtained from the GPS module of the device.



Viewing Z coordinates of point features

Information about Z coordinate (height) of GeoPackage point features is displayed in the additional virtual field *Height* in the feature identification card.



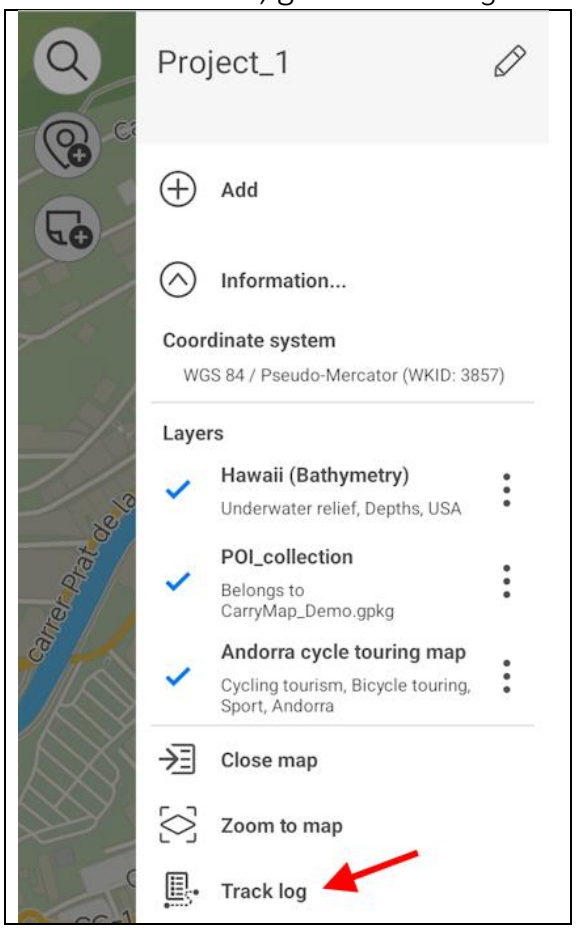
The units selected in the *Application settings* are used as the measurement units.

Section 5. Additional functionality

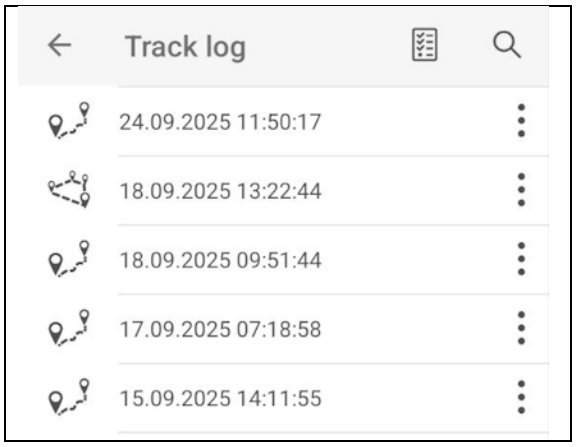
Track log

All tracks are automatically recorded by the app in the tracks log. Here you can find and restore any track even if an error occurred and the application was interrupted.

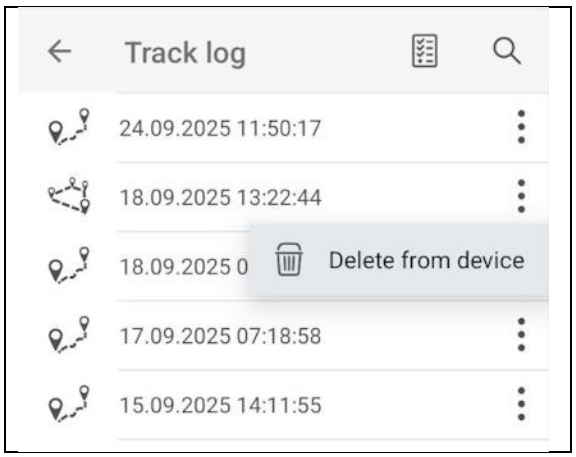
To view all tracks, go to *Track log* section in the project menu.



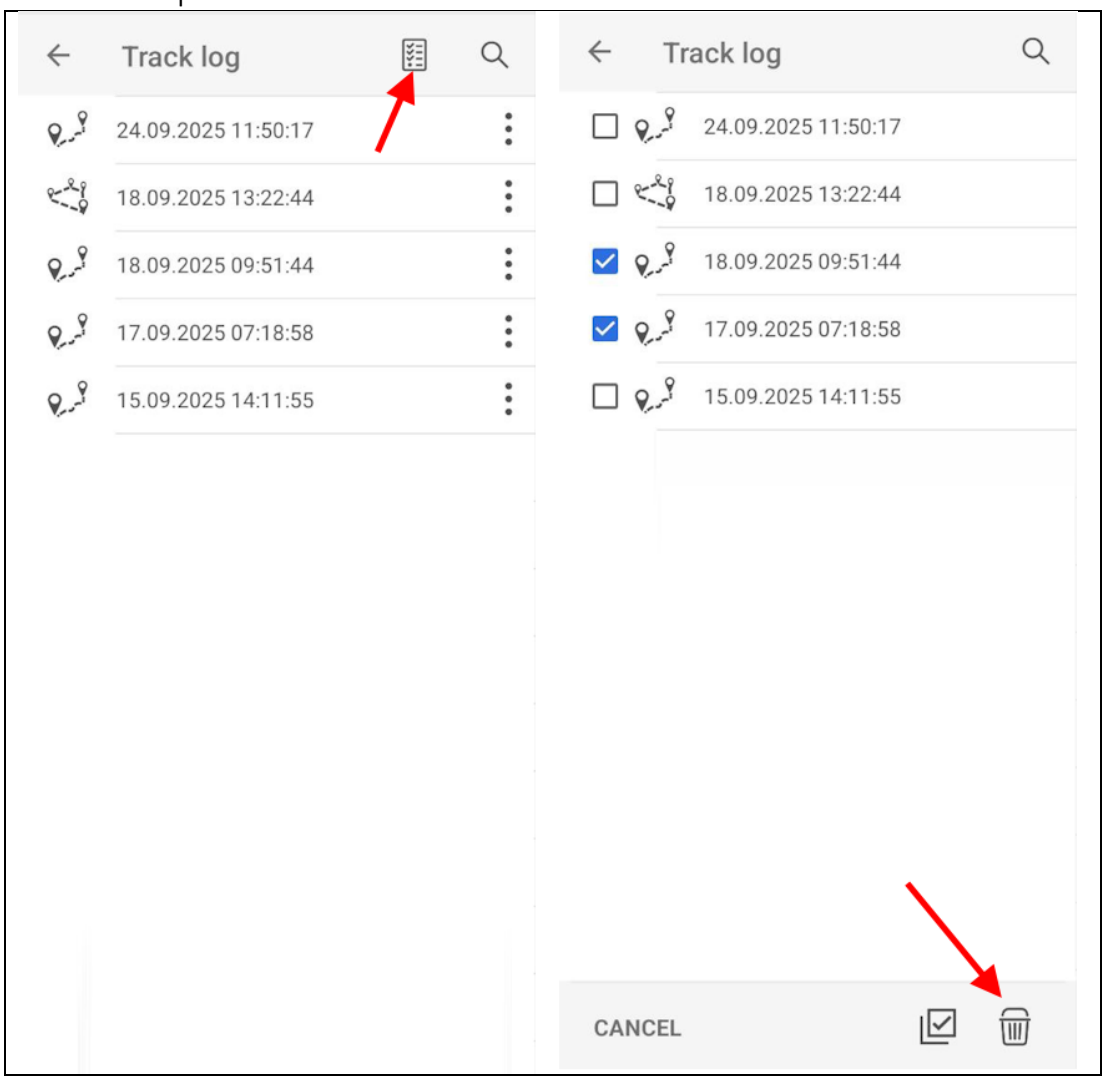
The list with all tracks will appear. Tracks are sorted by date and time they are recorded.



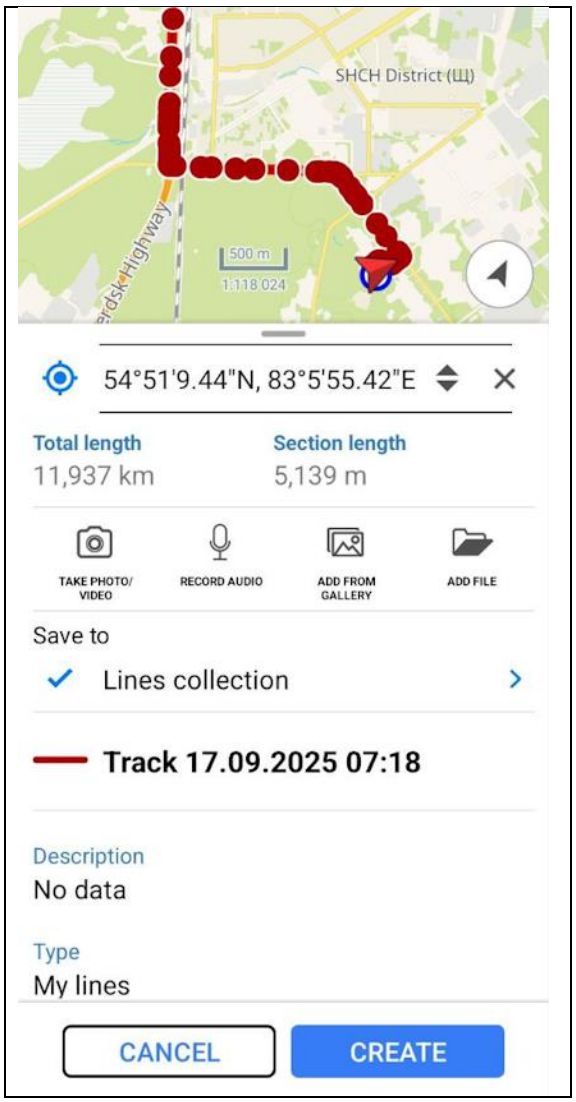
To delete the track, tap three dots and select *Delete from device*.



If you need to delete multiple tracks, tap *Select all* button, select the required tracks and then tap *Delete*.



To restore the track, select it from the list. The geometry of the selected track will be displayed on the map.



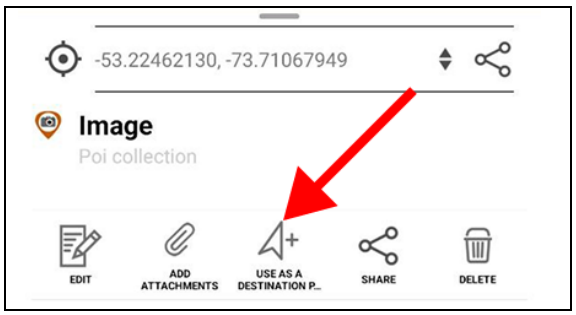
To save the track, press *Create*.

Use as a destination point*

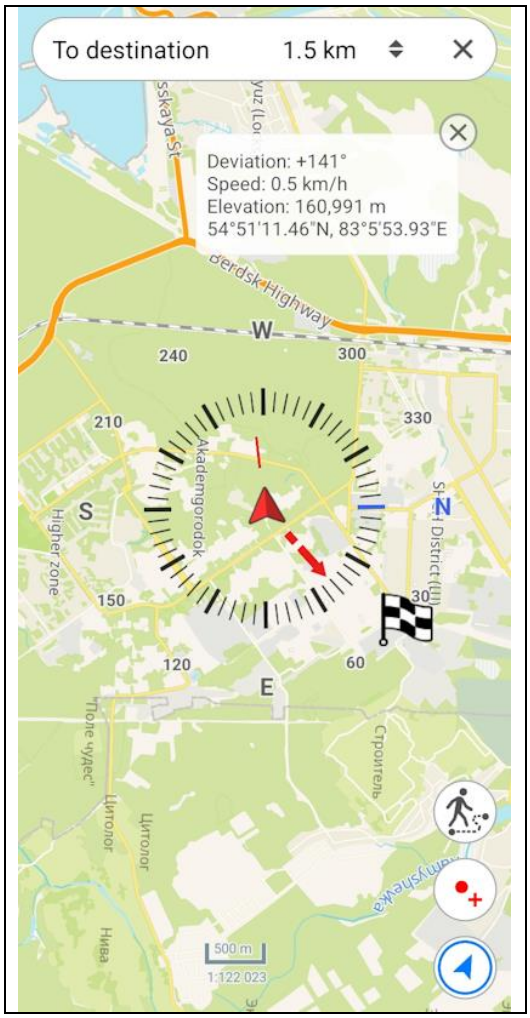
*Note that you can view information about the distance to your destination, your average approach speed, the recorded track length, and disable the *Use as a destination* option in the app on your Wear OS.

The *Use as a destination point* option allows selecting the feature or place on the map as a destination you want to reach.

To specify the place as your destination, tap the required place on the map and select *Use as a destination point*.



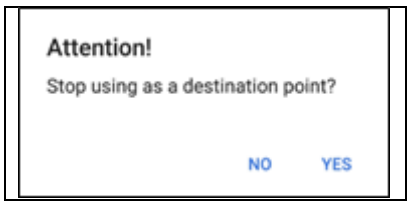
When the *Use as a destination* option is enabled, the arrow showing direction to specified destination appears on the screen, and the distance to it and the average approach speed to your destination point appears in the upper part of the screen.



The target feature will be marked with the flag symbol 🏁.

To disable use of the *Use as a destination option*, tap the cross icon in the upper part of the screen 

and then tap *Yes* in the appeared dialog.

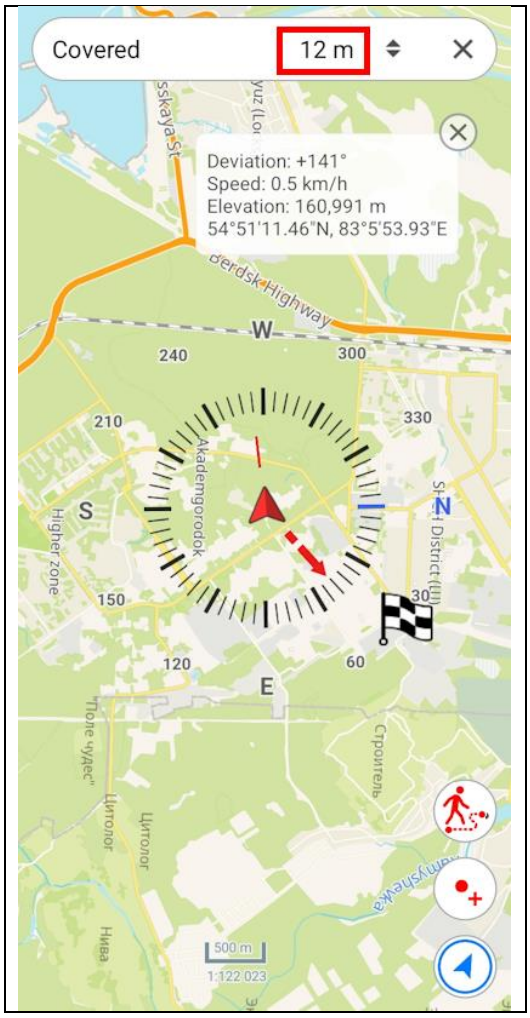


The *Use as a destination* option will be disabled.

When the *Use as a destination* option is enabled, the distance to specified destination and average approach speed to your destination point appears in the upper part of the screen.



When the *Use as a destination* option is enabled and recording track is started, the box in the upper part of the screen displays the distance to specified target feature and the covered distance, i.e. the length of the recorded track.



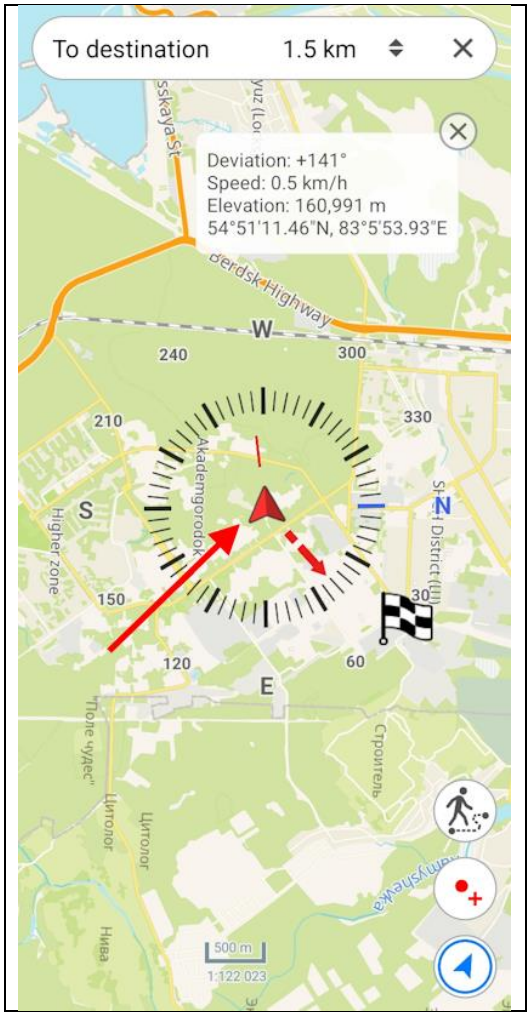
The units selected in the [*Application settings*] are used as the measurement units.

To change the displayed distance, press *Switch* button.



Your current location will be marked with the cross button and direction to the target will be marked with the red arrow.

During use of the *Use as a destination* option you can create a point feature in your current location point. To do so, tap the cross button .



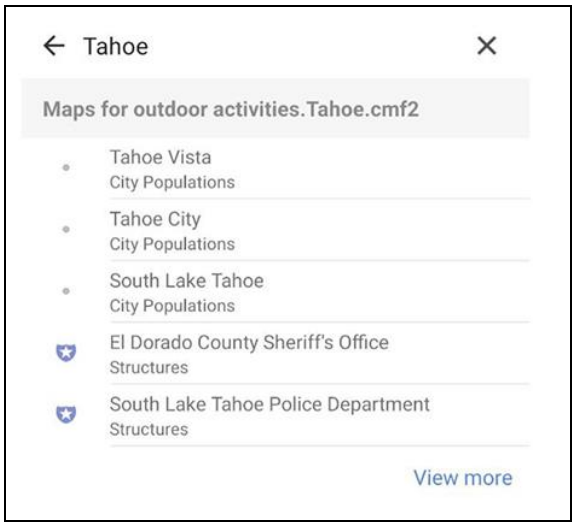
In the appeared window select the layer where to the point feature will be added. To confirm your selection, press CREATE.

Searching features

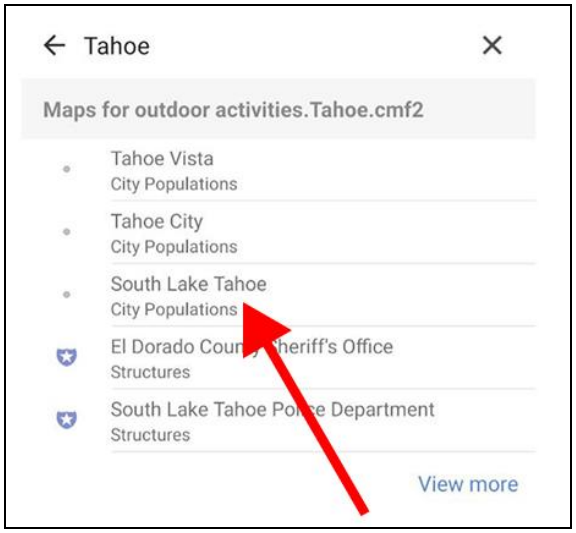
To search for GPKG feature or CMF2 by attributes, open the search field pressing the search button.



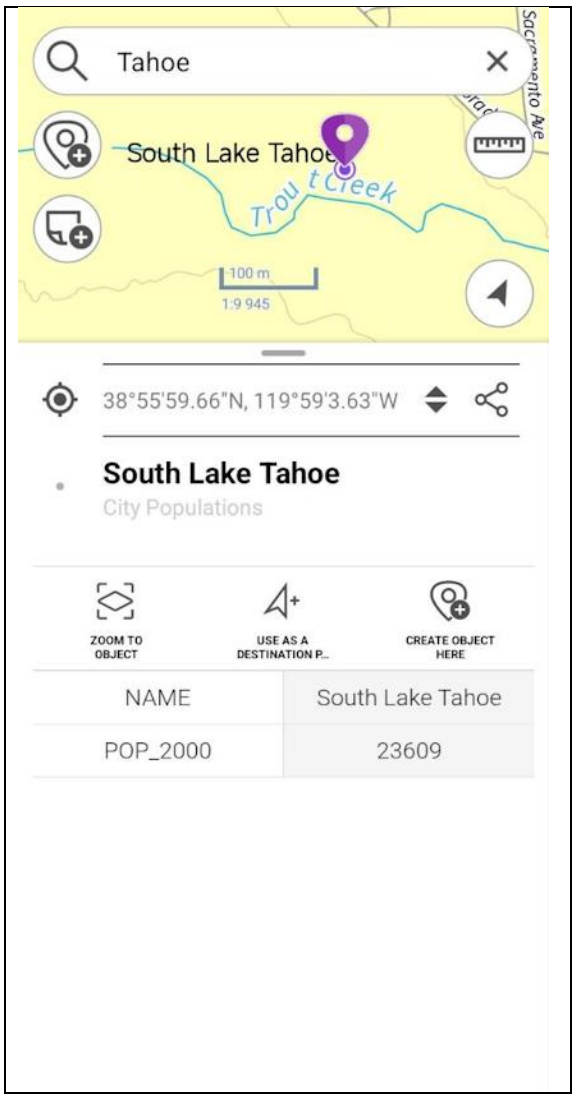
Enter the search text to the appeared field (for example, the point name, description, etc.) and press *Return* on the keyboard. The search results will be shown in the list.



To go to the found feature on the map, press its name in the search results list.

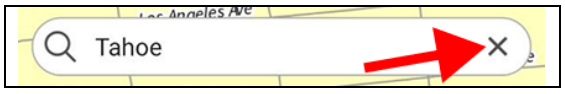


The feature will be marked on the map.

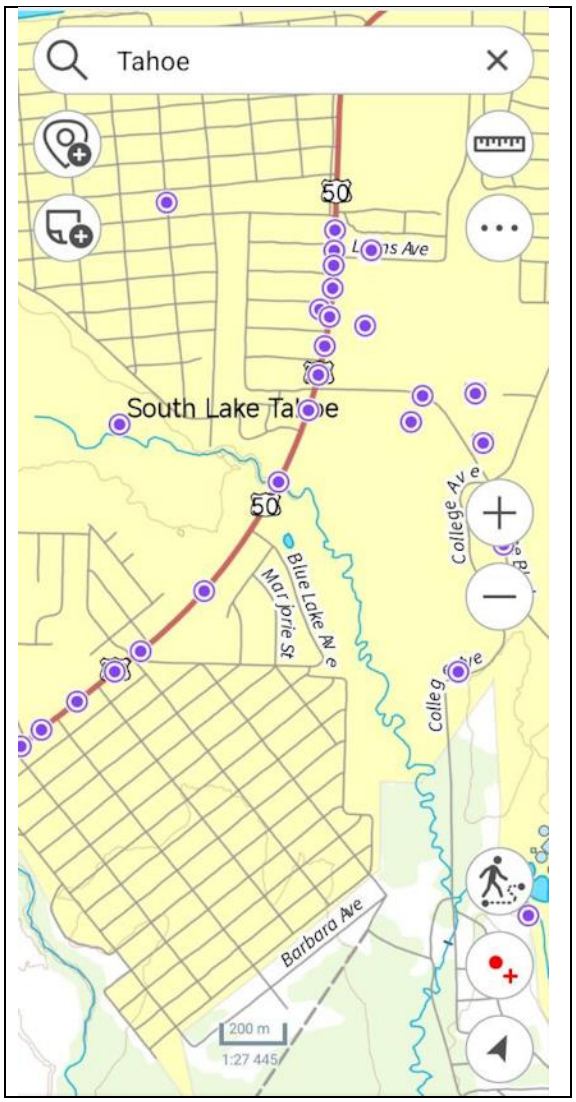


To perform an "exact search", before entering the search numeric or text value, put "!" and then enter the required number or text to search for.

To clear search request, press *Clear search.*



To view all found features, press the arrow  and all found features will be marked on the map.



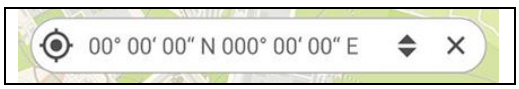
If no features were found during search, you would see the *Features not found* message.

To go to feature by coordinates, open the search field pressing the search button .

The text search field will appear. To switch to the go to coordinates mode, press *Switch* button.



To open the go to DMS coordinates window, press *Switch* button one time.

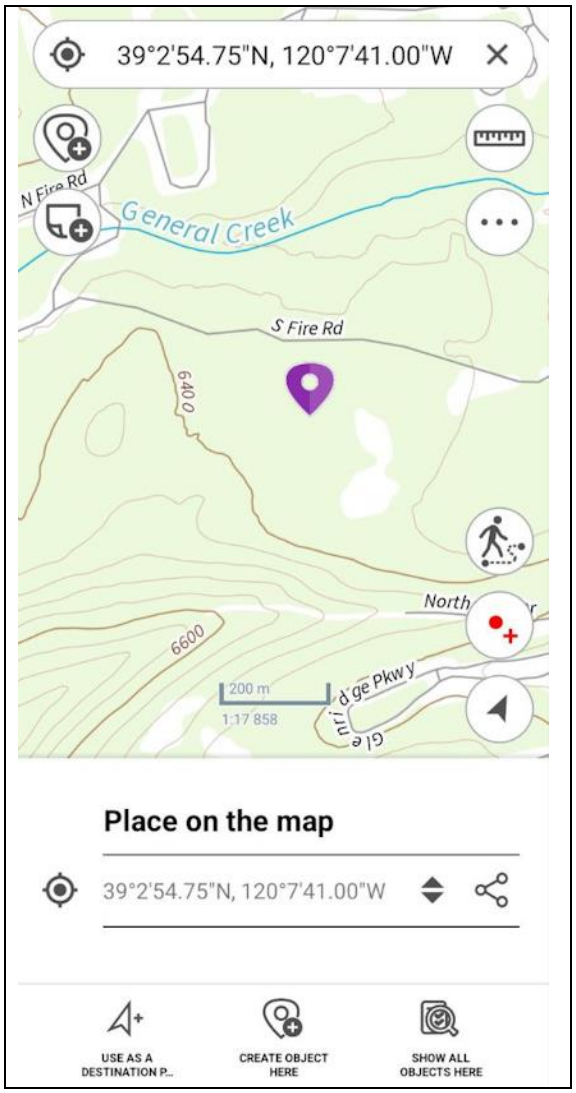


To open the go to DD coordinates window, press *Switch* button two times.

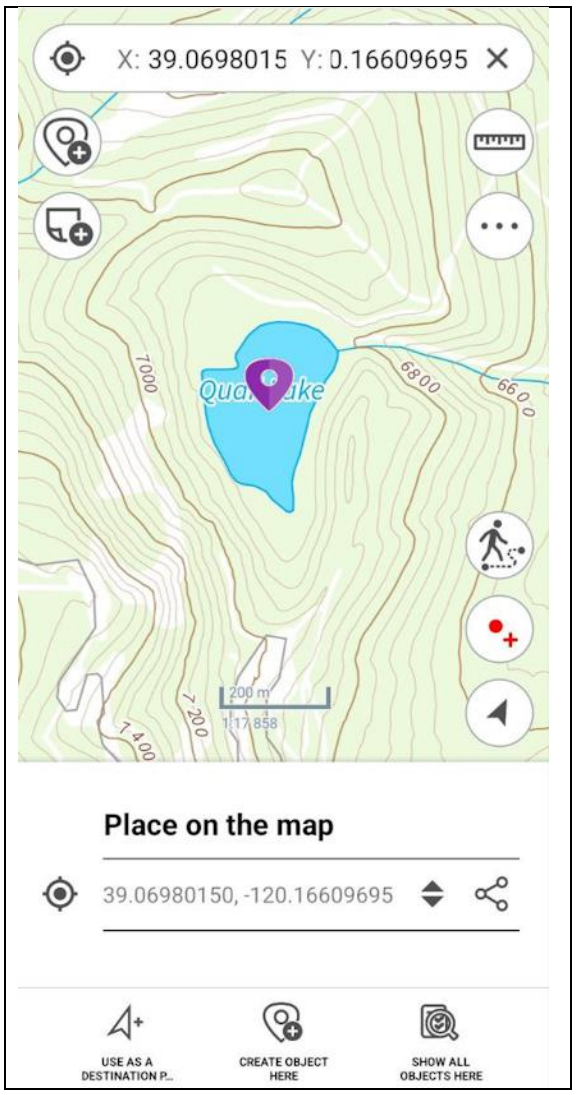


When entering DMS coordinates, to put º (degree), ′ (minute), or ″ (second) sign, press space after the number and the sign will automatically appear in the go to coordinates line. After entering the longitude and latitude values you need to enter their name: north, south and west, east.

Then press *Return* on the keyboard. The found point will be marked with icon on your map. The coordinates that you searched for will be shown in the card.



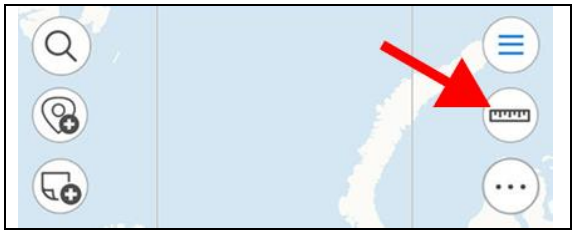
To go to DD coordinates, first enter X, then Y coordinate, and press *Return*.



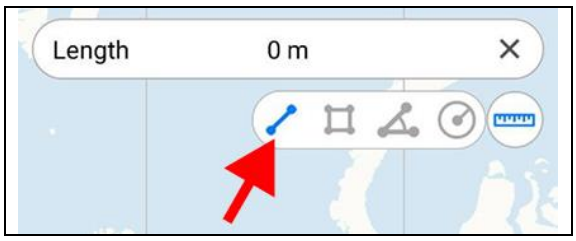
The found point will be marked with icon on your map. The coordinates that you searched for will be shown in the card.

Measuring on the map

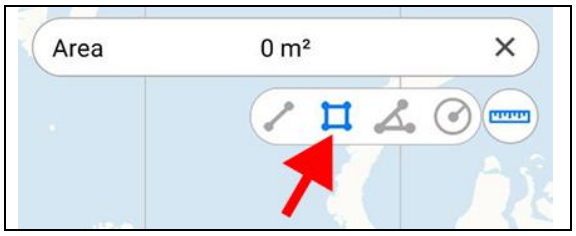
To measure on the map, tap the *Measurements* button. The button will change its color and the tool window will appear.



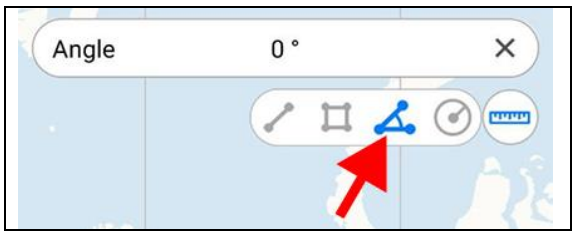
If you want to measure distance, tap *Measure distance* icon.



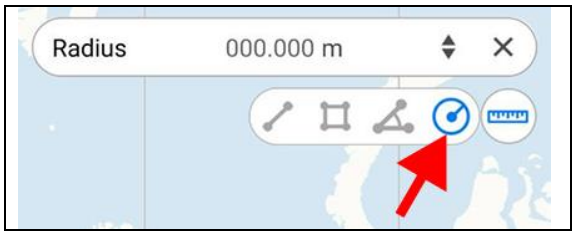
If you want to measure area, tap *Measure area* icon, accordingly.



If you want to measure geographic azimuth, tap *Measure azimuth* icon.

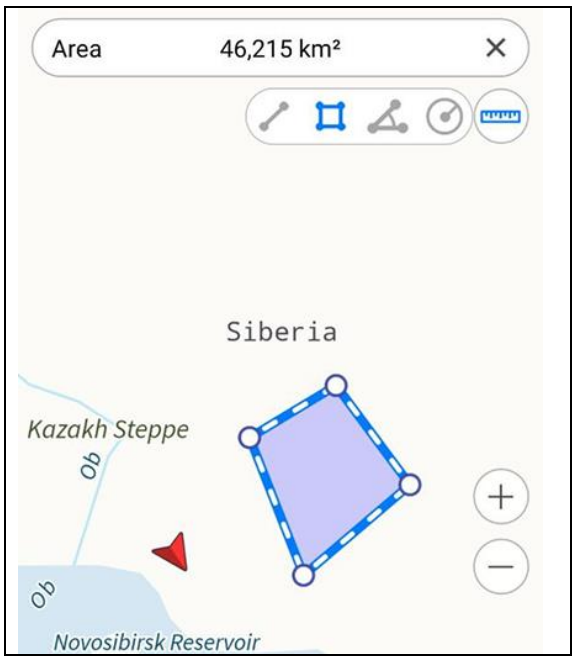


If you want to measure radius of a circle, tap *Measure radius* icon.



Measuring distance and area

To start measurement, sequentially tap the map adding points.



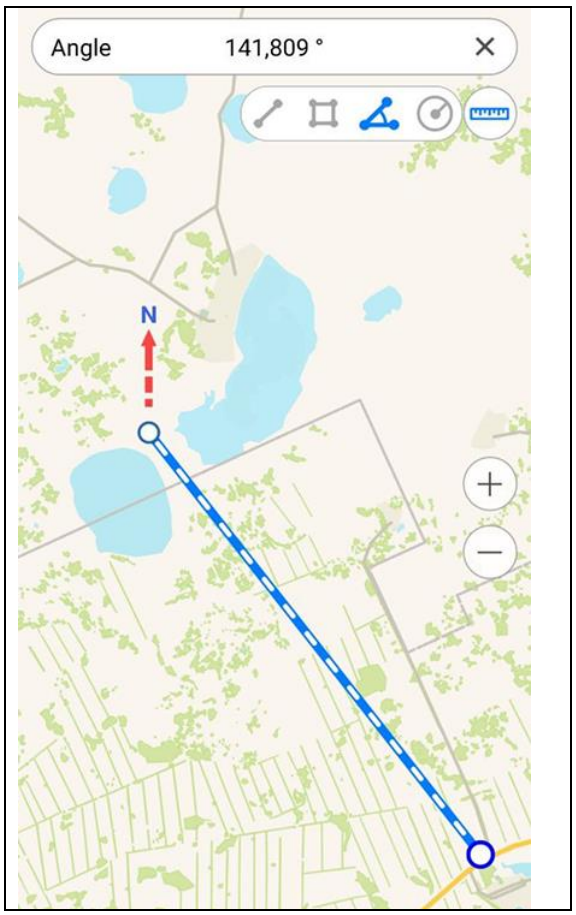
To delete the needless point, tap it again.

The calculated distance or area will be shown in the upper part of the measurement window.

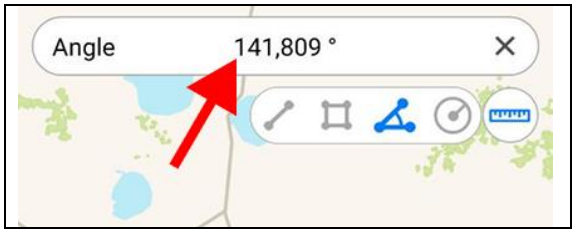


Measuring the geographic azimuth

To start measurement, sequentially add two points on the map.

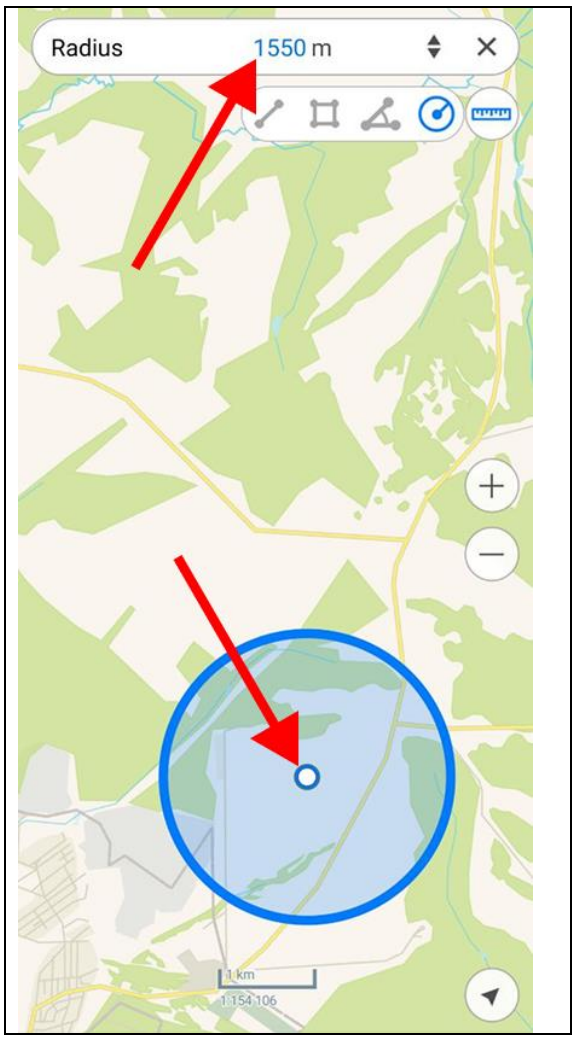


The calculated value will be shown in the measurement window.



Measuring the radius of a circle

To start measurement, add a point on the map and enter the radius value in the measurement window.



To change radius calculation units, press the *Switch* button.

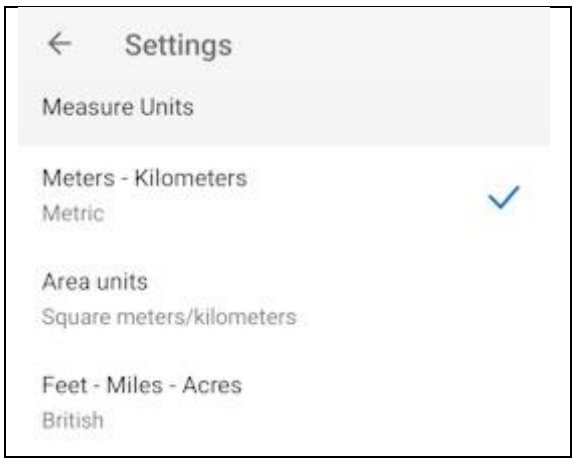


Measuring on the map is also possible using *My location* option. To start measurement from the point of your current location, select the tool and then tap button. Now the point of your current location will be used as the starting or one of the intermediate points of measurement.

To change measurement units for distance, areas or circle radius, go to *Application settings* of the map menu (note that changing units is possible if you are not in the measurement mode). In the *Measure units* section select the required units:

- Metric system (meters, kilometers):
  - Area units:

    - Square meters/kilometers,
    - Hectares;
- British system (feet, miles, acres).



To close the measurement window, tap the cross icon in the upper right corner of the window or tap *Measurements* button again.



To copy the measurement result, long tap the value and tap *Copy* in the appeared dialog.

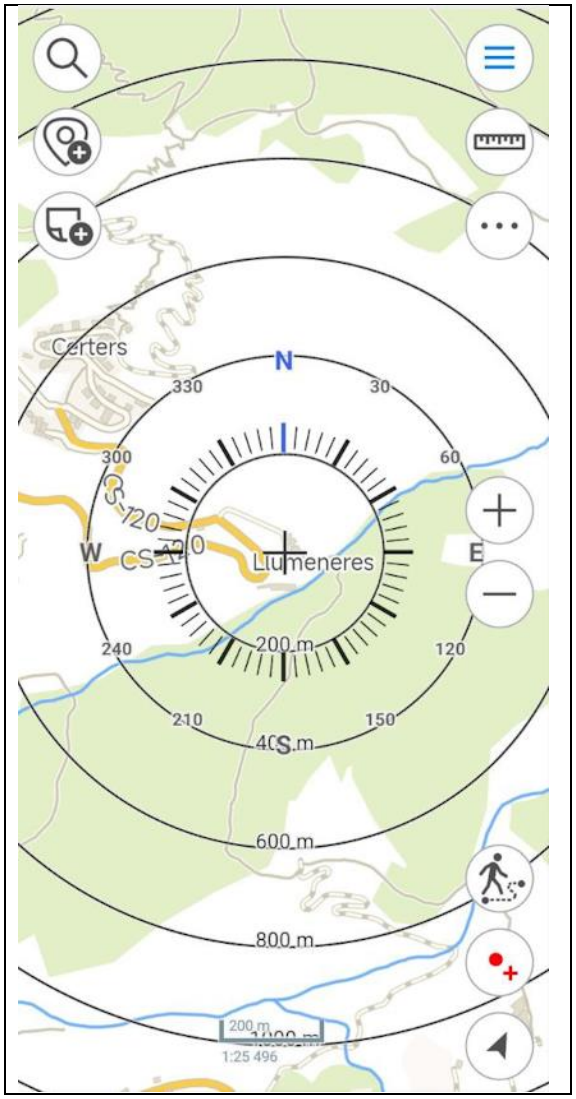


Circular ruler

The circular ruler is used to determine distances and directions on the map in real time.

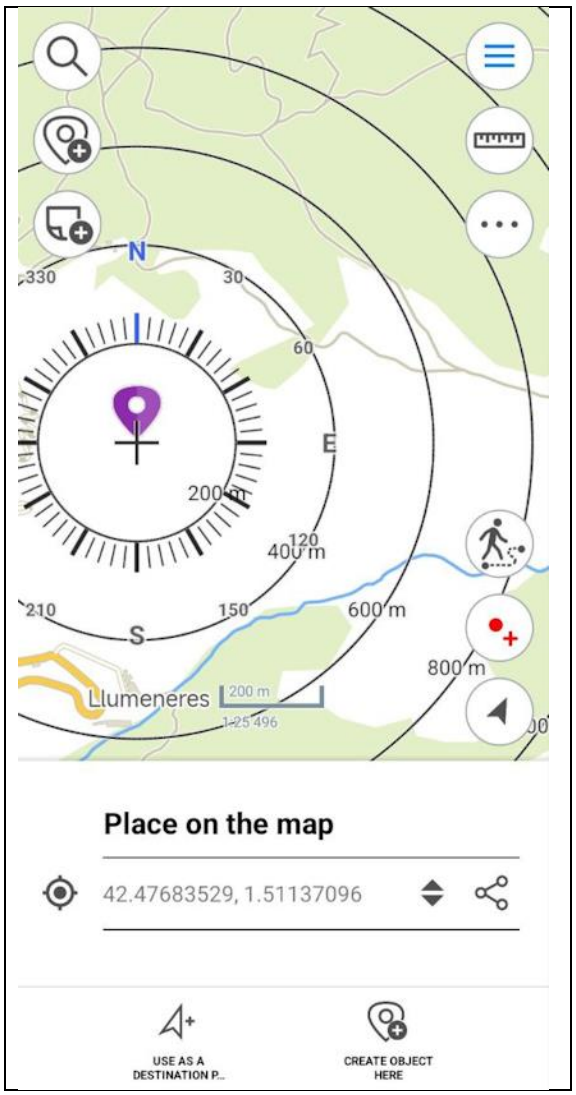
The circular ruler consists of:

- Limbus used to determine direction of the sides of the horizon on the map;
- Set of circular zones showing the distance from the center of the screen.*

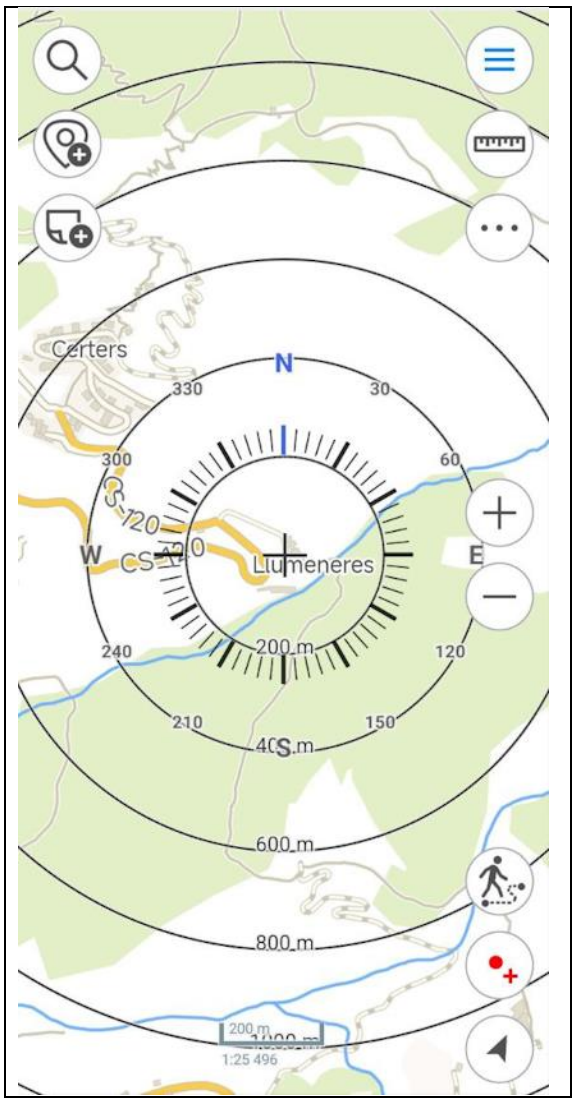


*NOTE: Zones sizes are calculated automatically depending on the map scale. The distances are displayed in the units specified in the *Application settings*.

The elements of the circular ruler are linked to the identification pushpin. When objects are identified, the map automatically positions to the identification pushpin, and the center of the circular ruler does not change its position when map is panned, or map scale is changed.

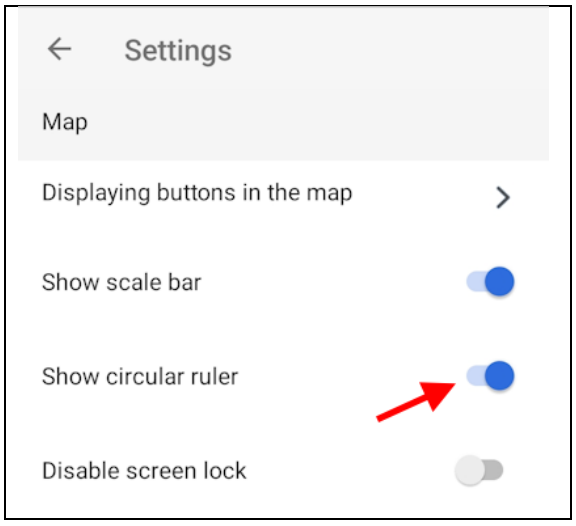


To display the circular ruler in the center of the screen again, close the identification card.



The display of the circular ruler in the map is disabled by default.

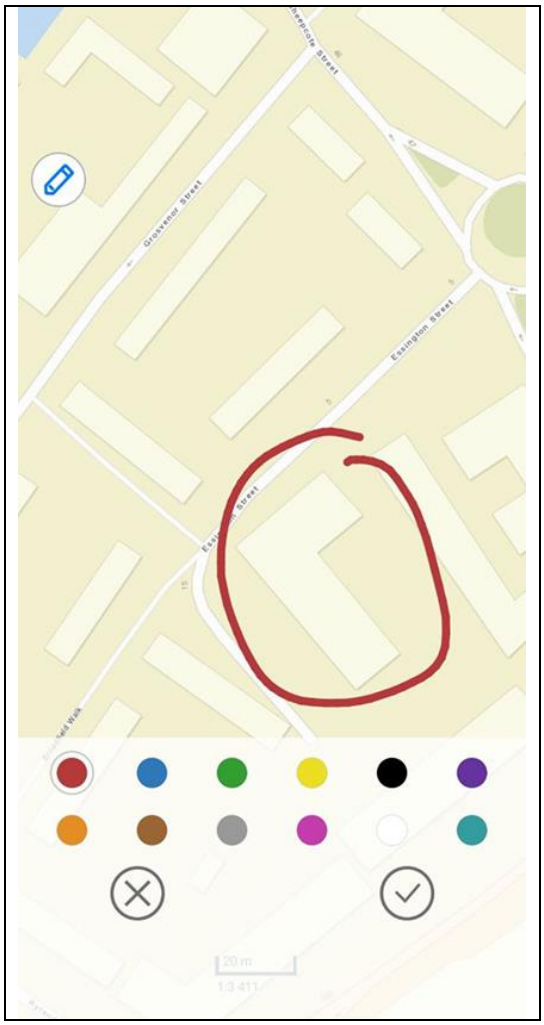
To enable display of the circular ruler on the map, go to *Application settings* and pull the switch in the *Show circular ruler* section.



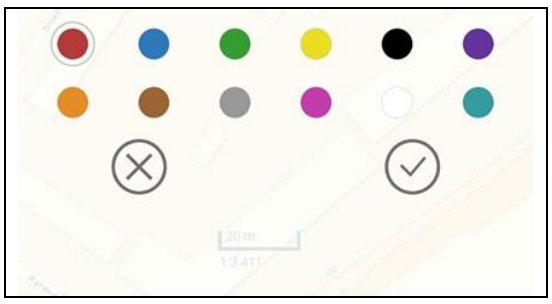
Creating marks

To create the graphic mark on your map as a text, custom shape or arrow, press *Create mark* button and select the note type.

To create the mark as the custom shape, press button. Draw the required shape on the map.



To change the note color, select the required color from the provided list.

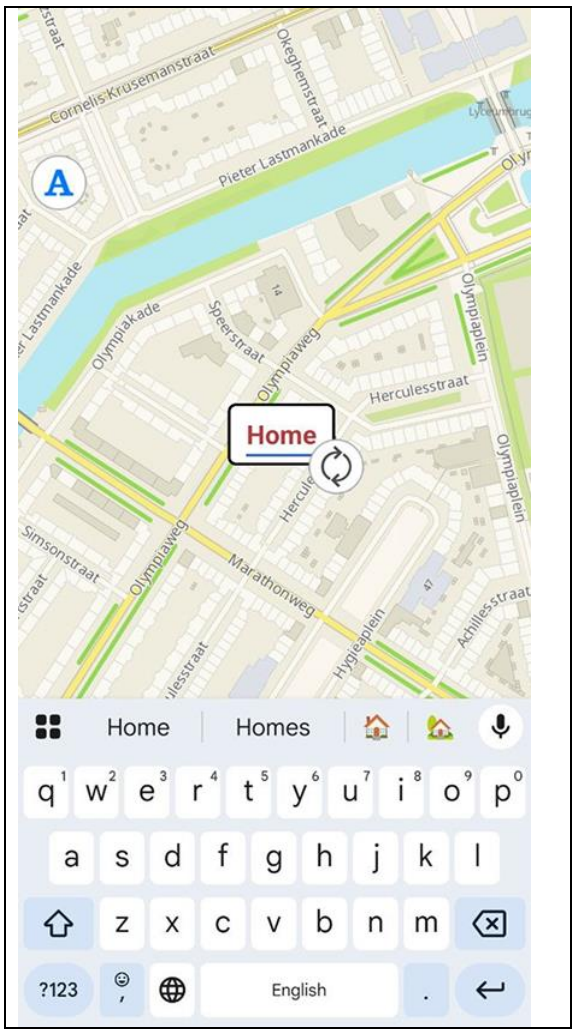


To save the mark, press Save .

To cancel creating the mark, press Cancel .

To create the text mark on the map, press .

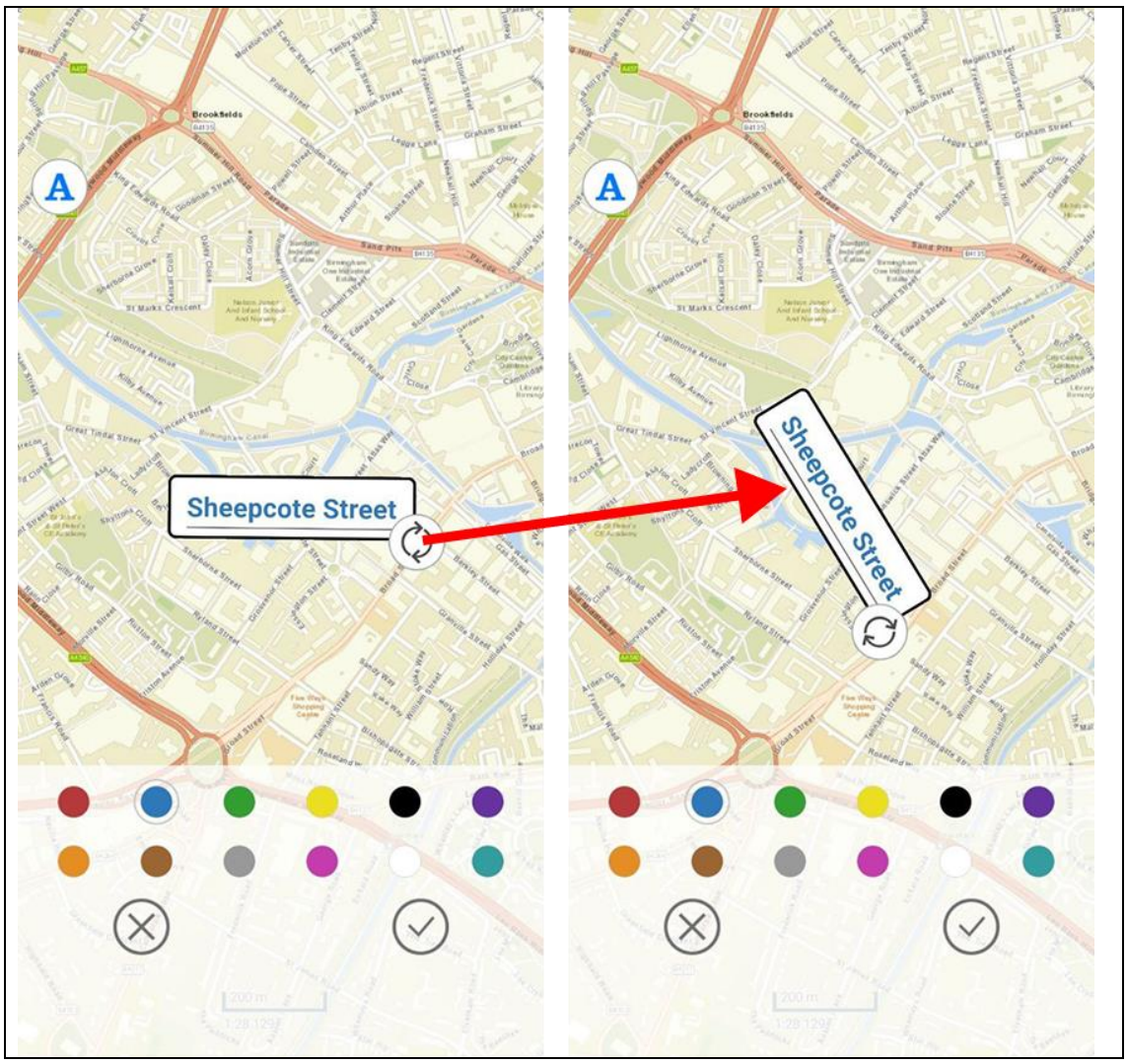
In the appeared field enter the note text and press *Done* on the keyboard.



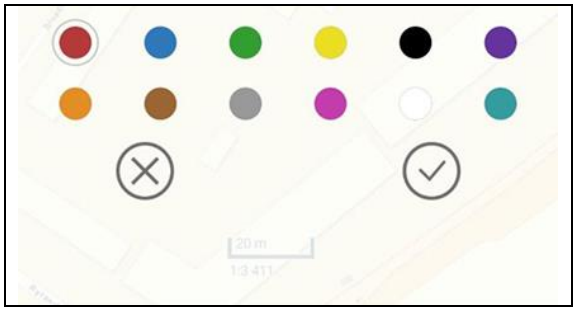
To change location of the text mark, long tap the note and drag it to the new place on the map.



To change the text mark direction, hold the text box on the map and rotate it as needed.



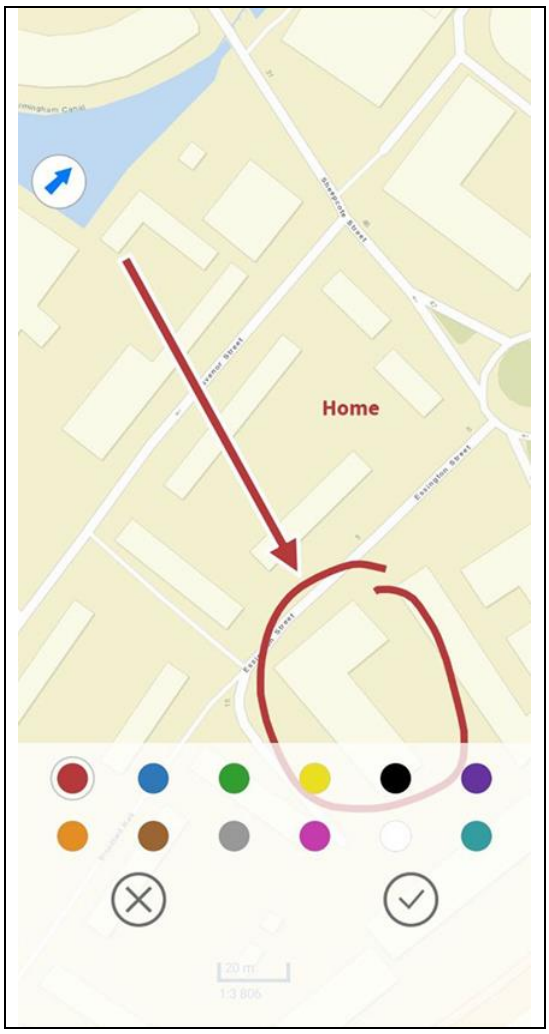
To change the text mark color, select the required color from the provided list.



To save the text mark, press *Save* .

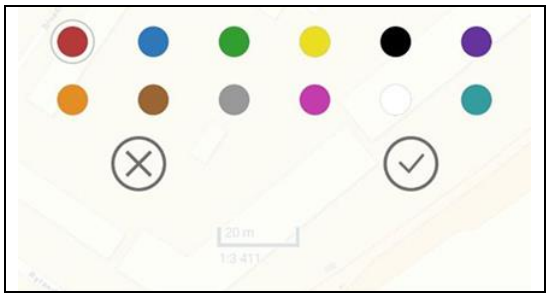
To cancel creating the text mark, press *Cancel* .

To create the mark as the arrow, press .
Now draw the arrow on the map, specifying the start and end point of the arrow.



To change location of the arrow, specify the start and the end point of the arrow again, and the previously created arrow will be deleted.

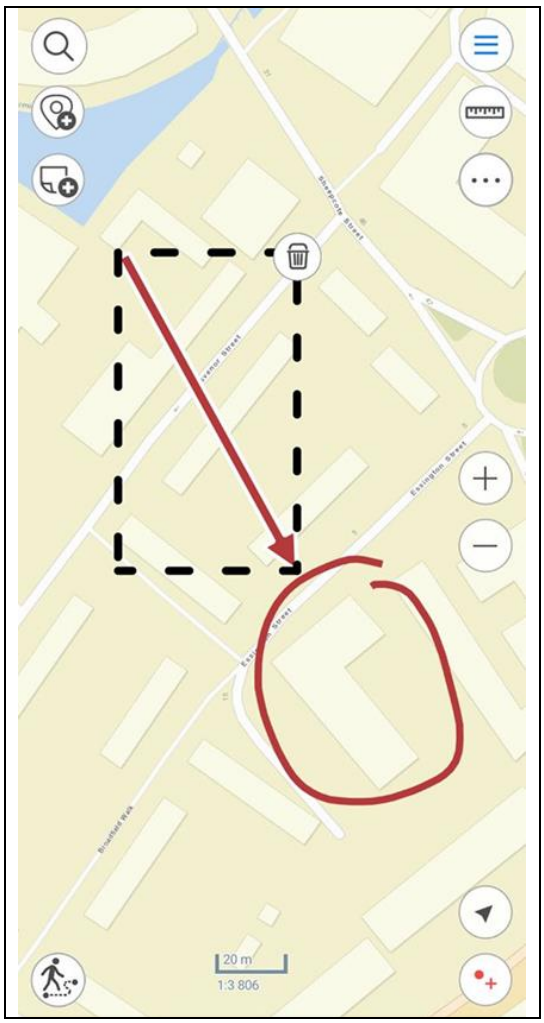
To change color of the arrow mark, select the required color from the provided list.



To save the arrow mark, press *Save* .

To cancel creating the arrow mark, press *Cancel* .

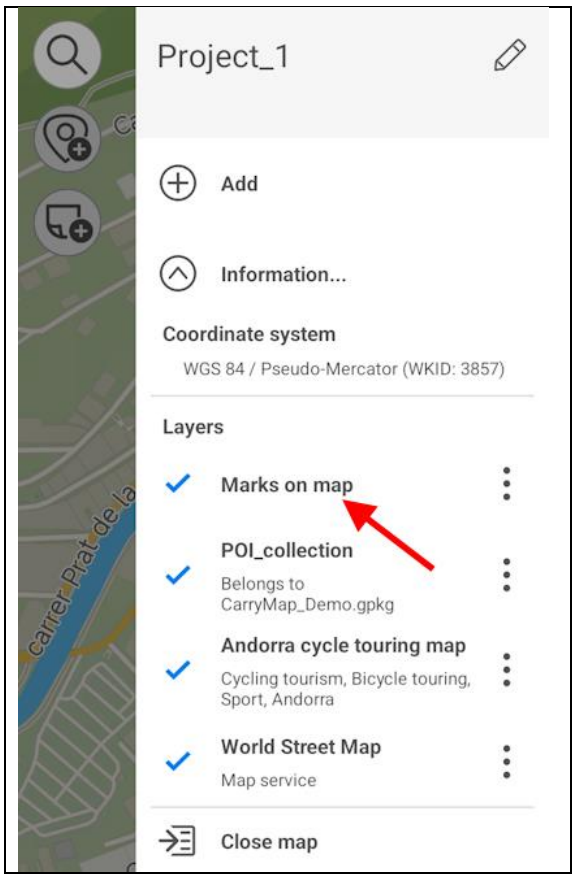
To delete the arrow mark, long tap it on the map.



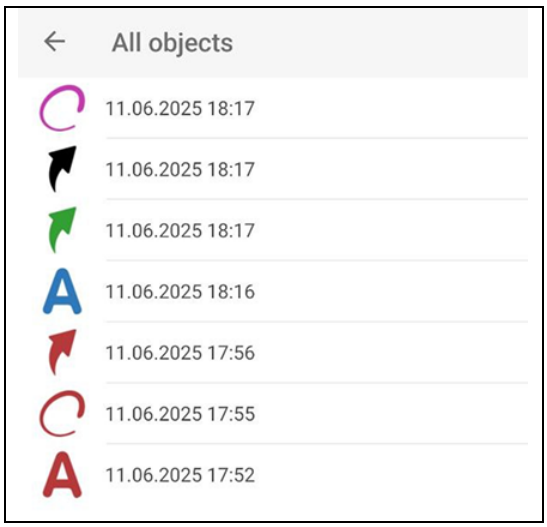
Then press  and your arrow will be deleted.

To turn off the layer with marks, go to the main menu pressing , and press the check sign 

.
To view all created marks, select *Marks on map* layer.



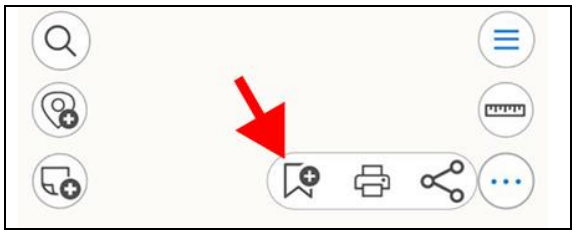
The list with all marks will appear.



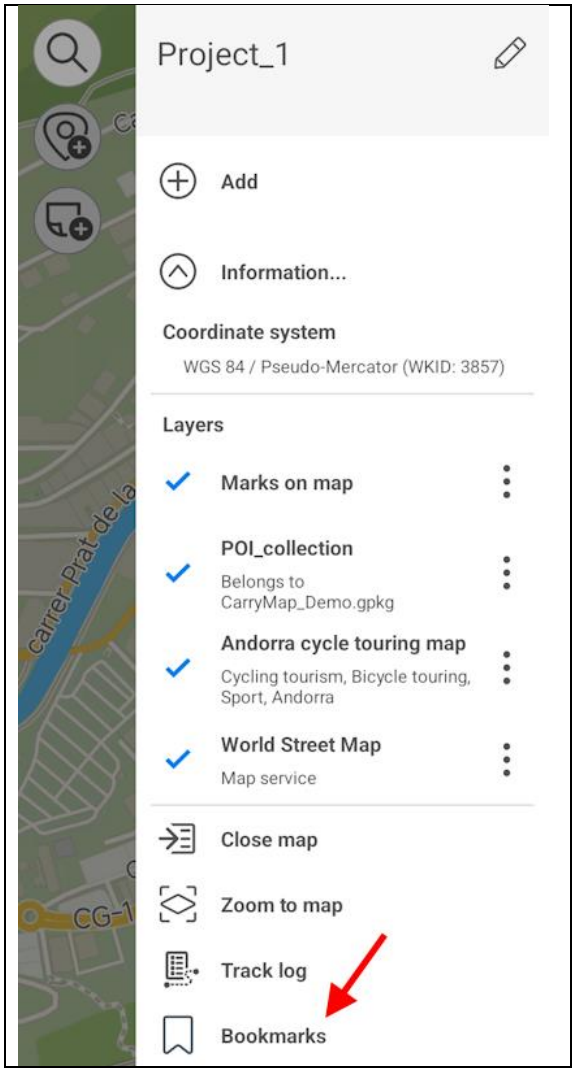
To go to any mark on the map, select it from the list and it will be opened on the map.

Creating bookmarks

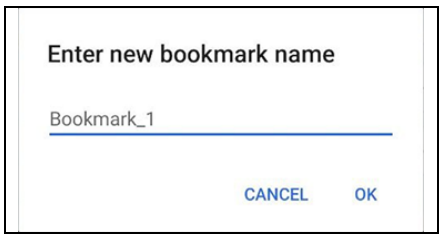
Bookmarks are provided for storing the needed map extents and data. To create the bookmark, set the required map area boundary, go to *Additional tools for work with map* and tap *Create bookmark*.



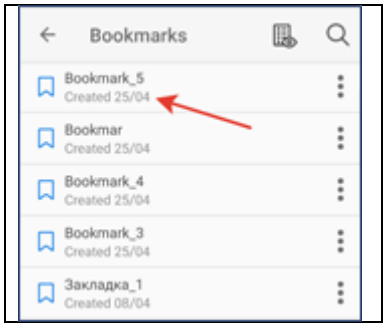
Enter the bookmark name or leave the default name. To save the bookmark, tap *OK*. To view the created bookmark, go to *Bookmarks* section in the project menu.



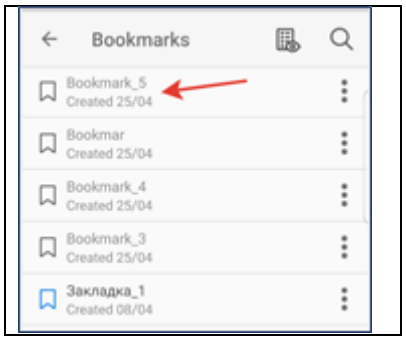
To delete the bookmark, tap three dots and select *Delete*. To rename already created bookmark, tap Rename, enter the new name and tap *OK*.



To go to the bookmark on map, select it from the list and it will be shown on the screen.



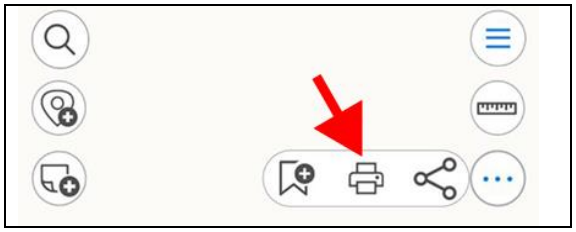
If previously created bookmark does not fall into the current map extent, it will be grayed out in the list and you will not be able to view it.



To view all active bookmarks of the current map, tap .

Save map extent

To save the map extent for printing or to save it to PDF document, set the required map area boundary, go to *Additional tools for work with map* and tap *Save to PDF*.



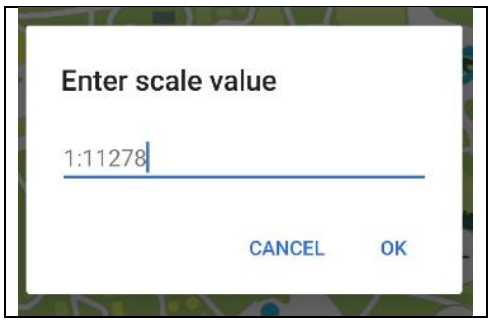
In the dialog that opens, select the required action to save or print the created map extent.

Selecting map scale

To set map scale open the map window and click on the scale bar.

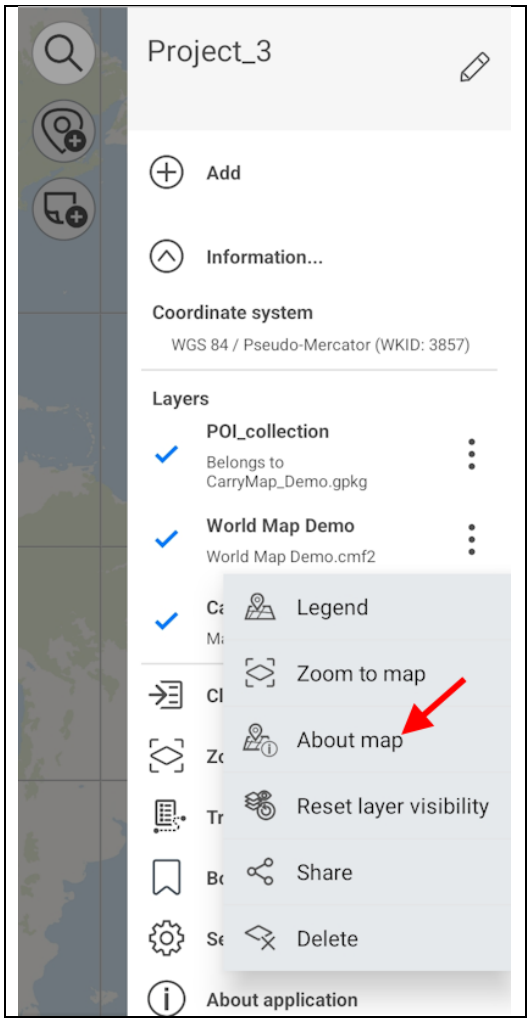


In the window that opens, enter the scale and click *OK*, the map will be drawn at the specified scale.

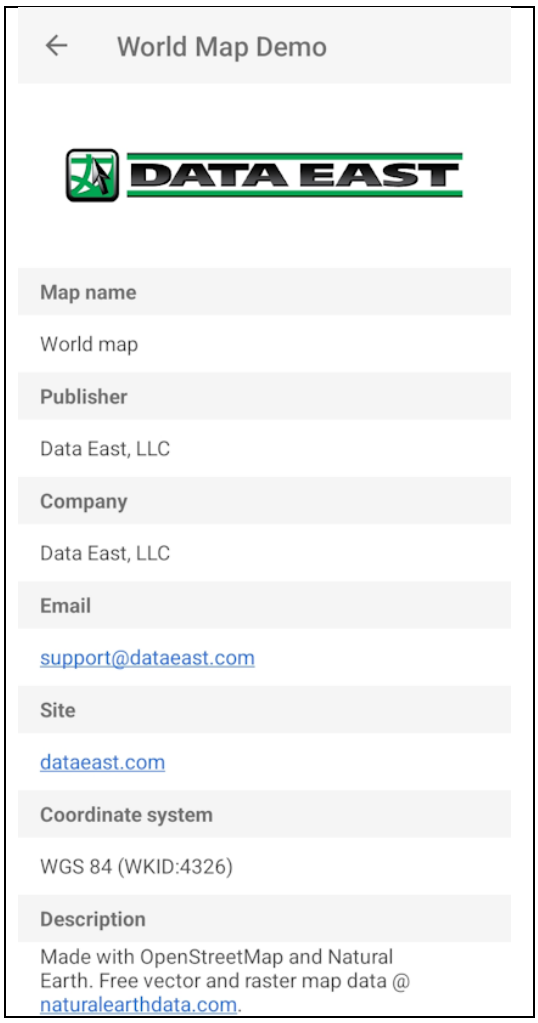


Map information

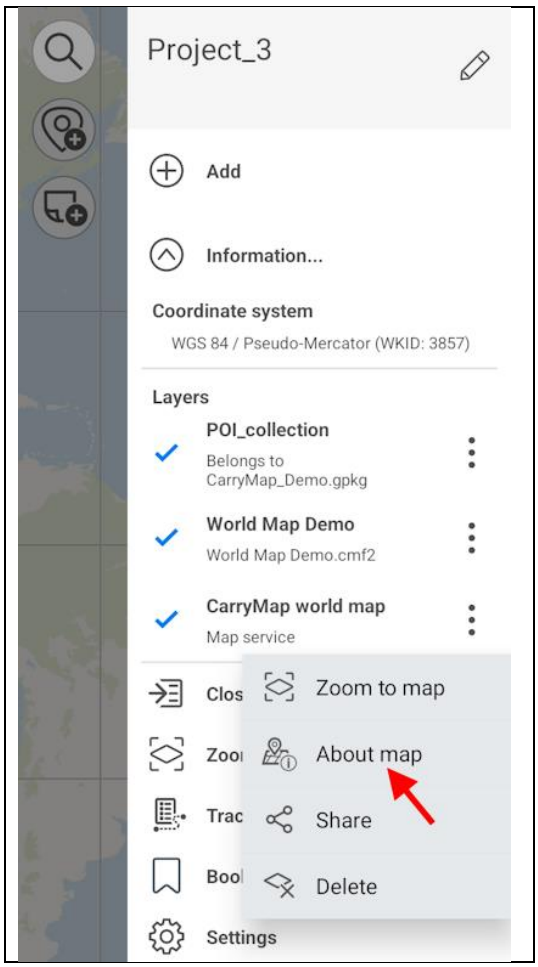
To view information about your CMF2 map, tap the three dots icon near the map name and select *About map*.



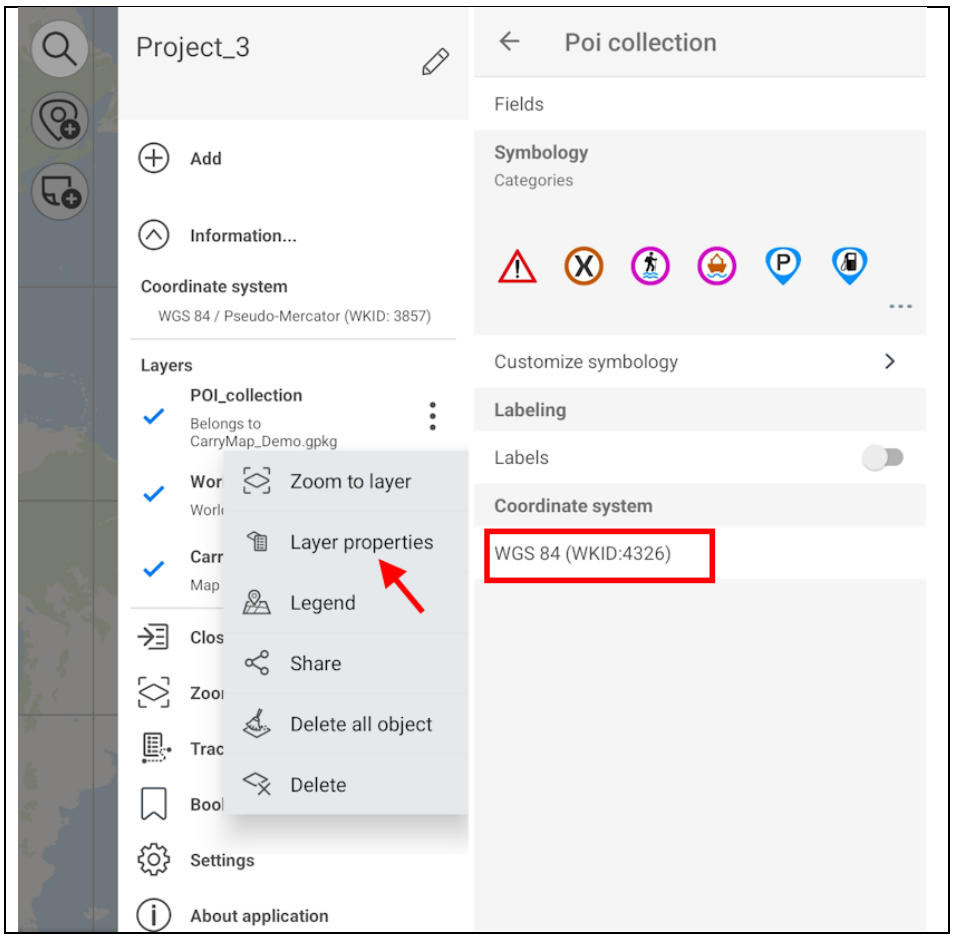
The window showing information about the map specified during its creation will appear: map name, publisher, company, email, website, coordinate system, logo, additional info.



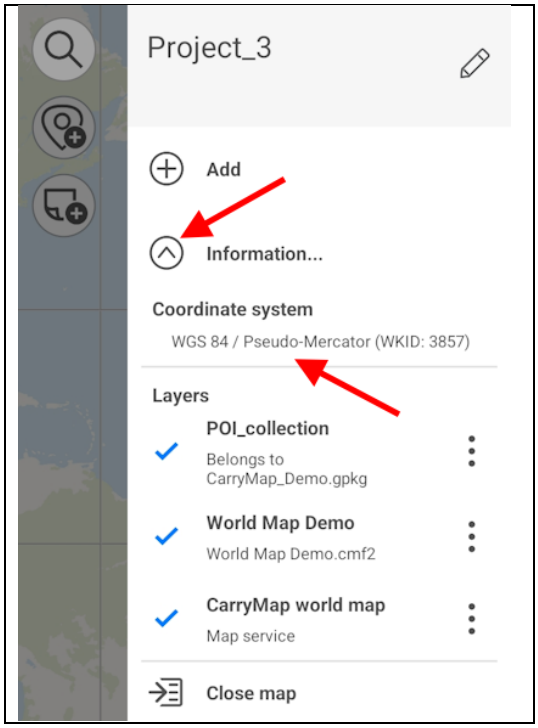
To view information about the online map service, tap the three dots icon near the service name and select *About map*.



To view information about coordinate system of the GeoPackage file layer, open the layer menu by tapping three dots and select *Layer properties*.
Information about the layer's coordinate system will be displayed in the corresponding section.

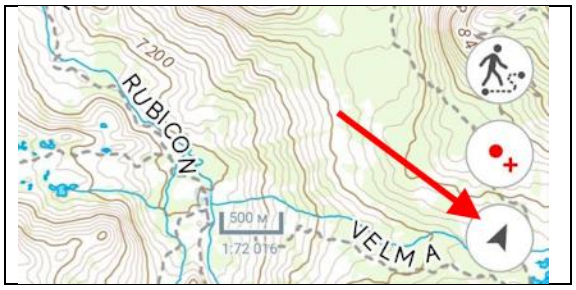


To view information about coordinate system of the current project, expand the *Information* section in the map menu.



Finding current location

To define your current location on the map, tap *My location* .

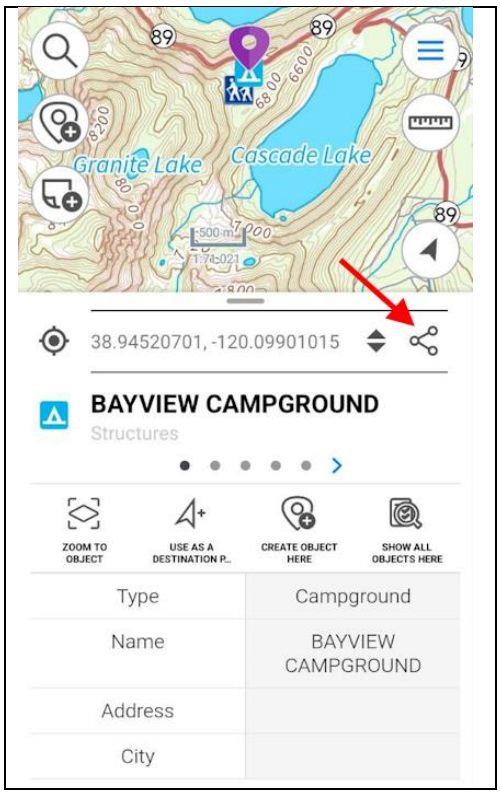


When the *My location* option is enabled, the button changes . To disable the option, tap any place on the map. If you tap the location button again, the map will go to the tracking mode and the button will look as . Being in the tracking mode, the map will rotate according to your current location. To disable tracking mode, tap any place on the map.

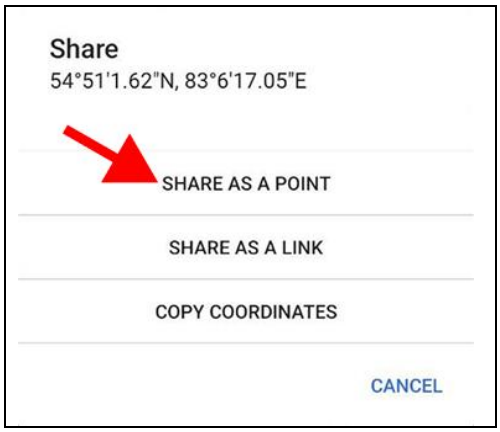
Sharing location information

CarryMap supports the ability to share information about your current location or coordinates of the selected location on the map.

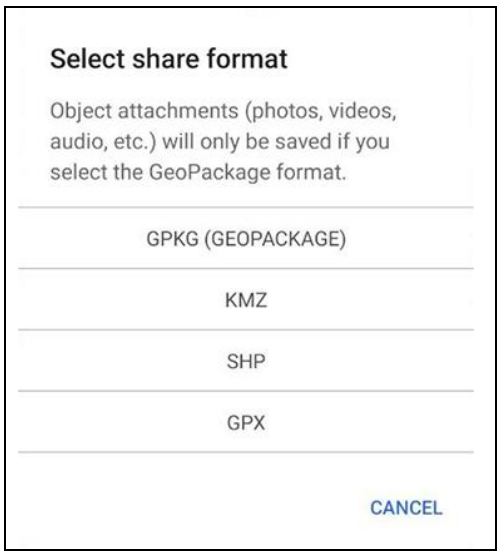
To share coordinates of the selected location on the map as a separate file in GeoPackage, KMZ, GPX, or SHP format, go to the coordinates line in the feature identification card and click the *Share* button.



In the appeared dialog, select *Share as a point*.

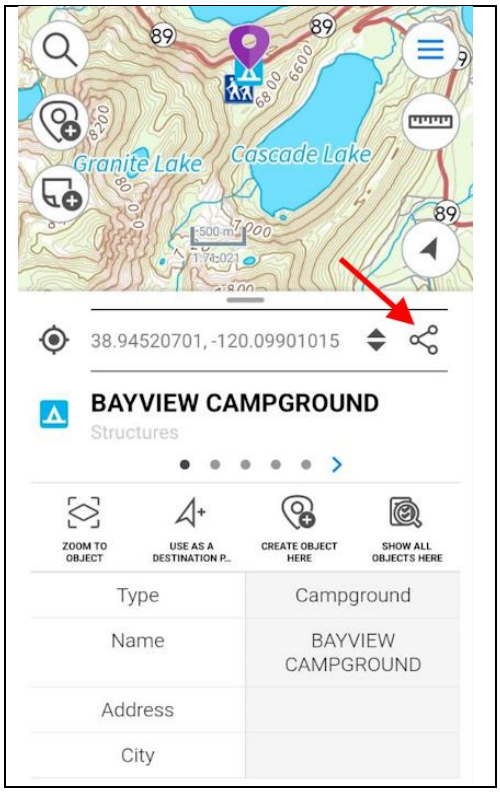


Then select the data format.

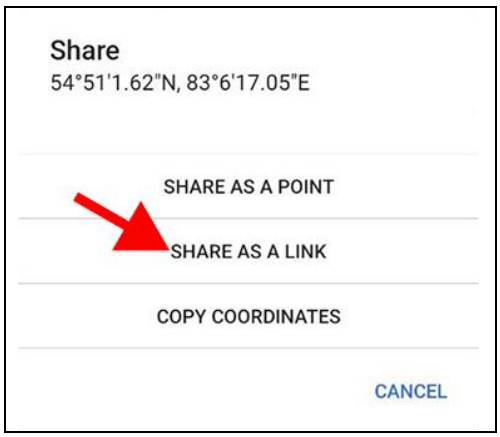


After selecting the format, select the method you want to use to share the file.

To share information about your current location or coordinates of the selected location on the map as a link, go to the coordinates line in the feature identification card and click the *Share* button.

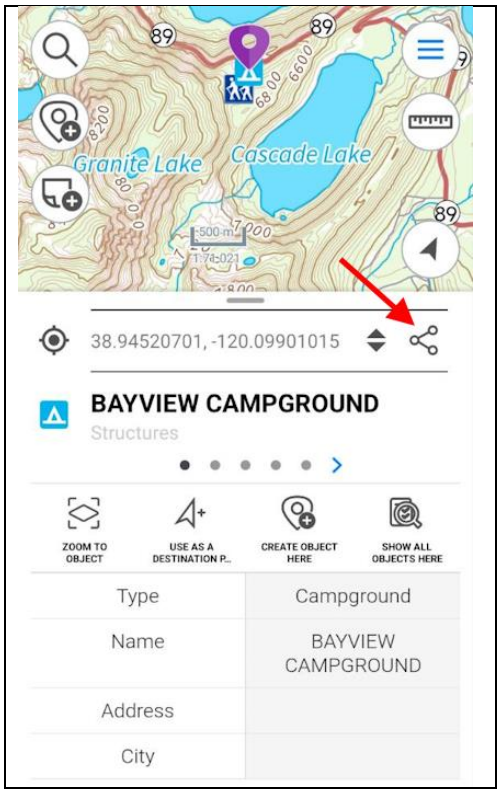


In the appeared dialog, select *Share as a link*.

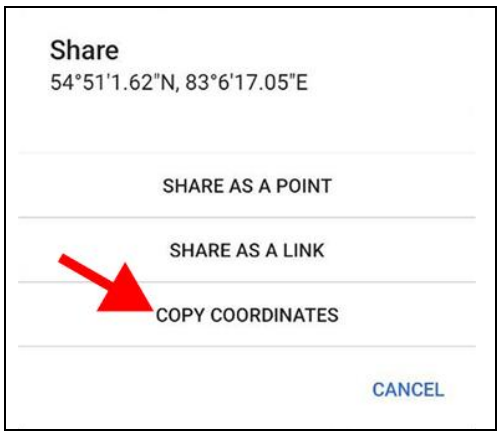


Then select the method you want to use to share link.

To copy coordinates of the selected location on the map, go to the coordinates line in the feature identification card and click the *Share* button.



In the appeared dialog, select *Copy coordinates*.

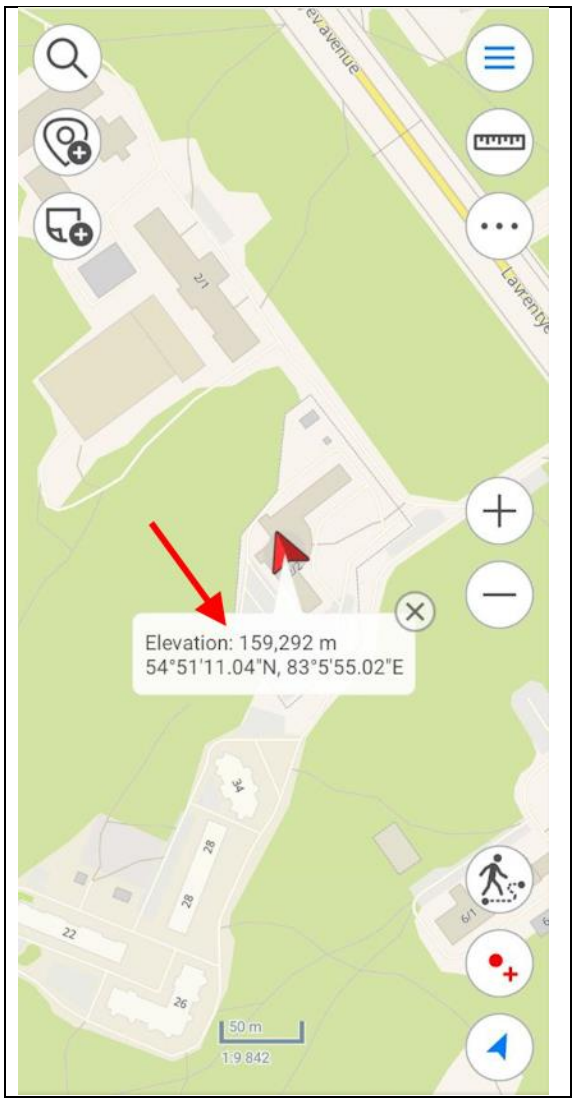


Displaying information from GPS/GLONASS receiver in the map window*

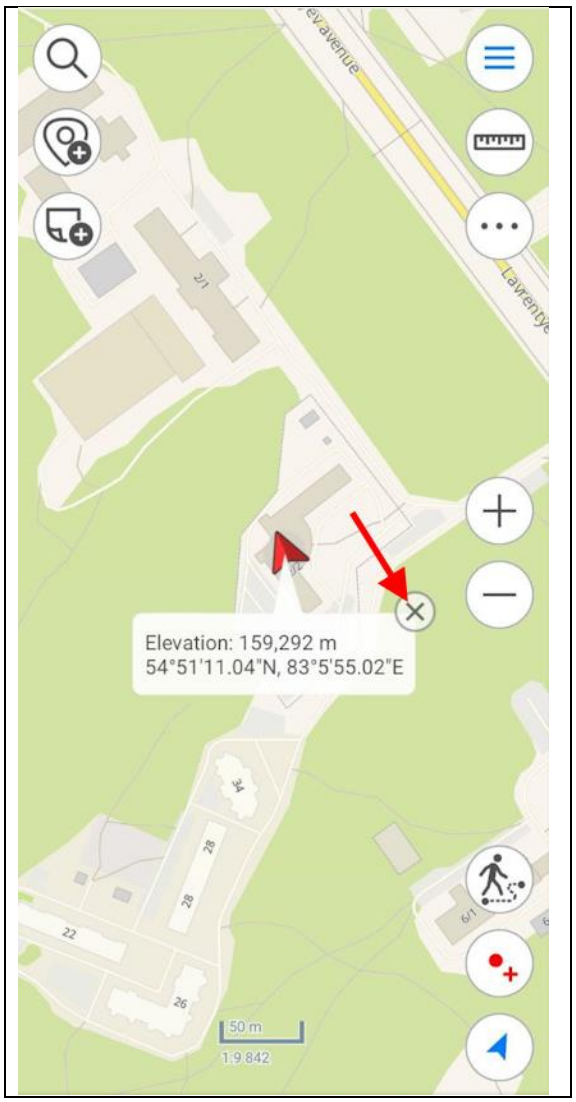
*Note that you can view information from your device's GPS/GLONASS receiver in the app on your Wear OS.

The GPS/GLONASS receiver information detection function is provided to display on the map your current location data and the movement parameters in real time.

The information from the GPS/GLONASS receiver of your device is shown in a separate block of the map window in active 'Find current location' mode, 'Track record' mode or when moving to a destination point option is enabled (see *Finding current location*, *Recording track* and *Use as a destination point* sections for more detail).

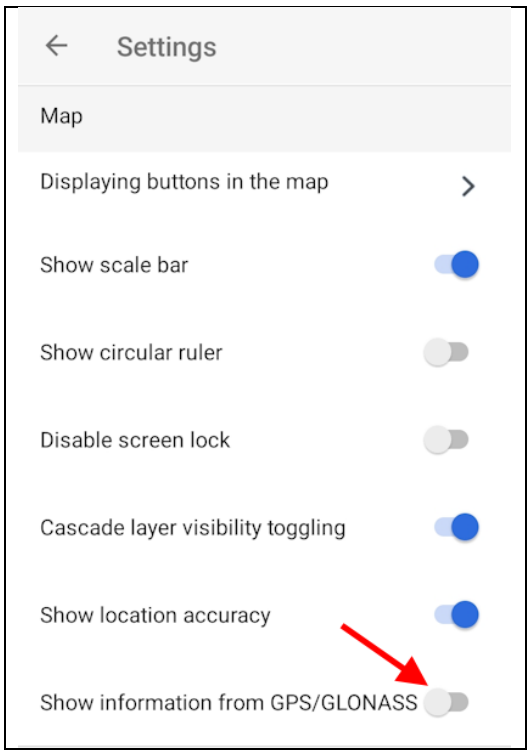


To disable display of information from your device's GPS/GLONASS receiver, tap the cross icon in the upper right corner of the block.



Note, that the display of the block with the information from the devices' GPS/GLONASS receiver will be disabled until the next activation of finding current location, start of track recording or moving to the destination point options.

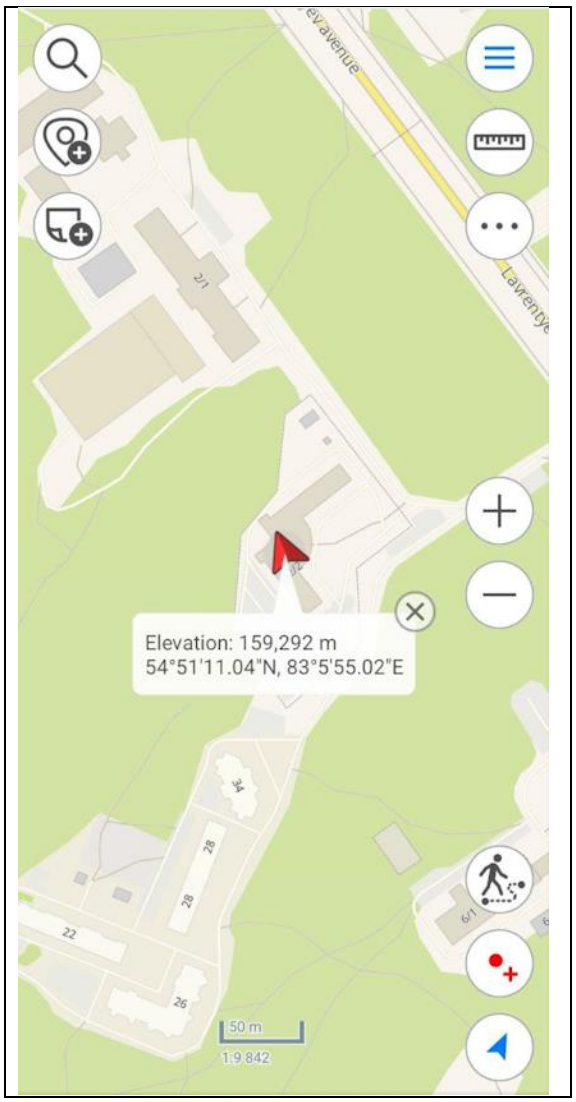
To completely disable display of information from your device's GPS/GLONASS receiver, go to *Application settings* and change the switch position in the *Show information from GPS/GLONASS* section.



Displaying information from GPS/GLONASS receiver when finding location mode is enabled

While finding location mode or moving to destination point option is enabled, the following information from the device's GPS/GLONASS receiver is displayed on the map:

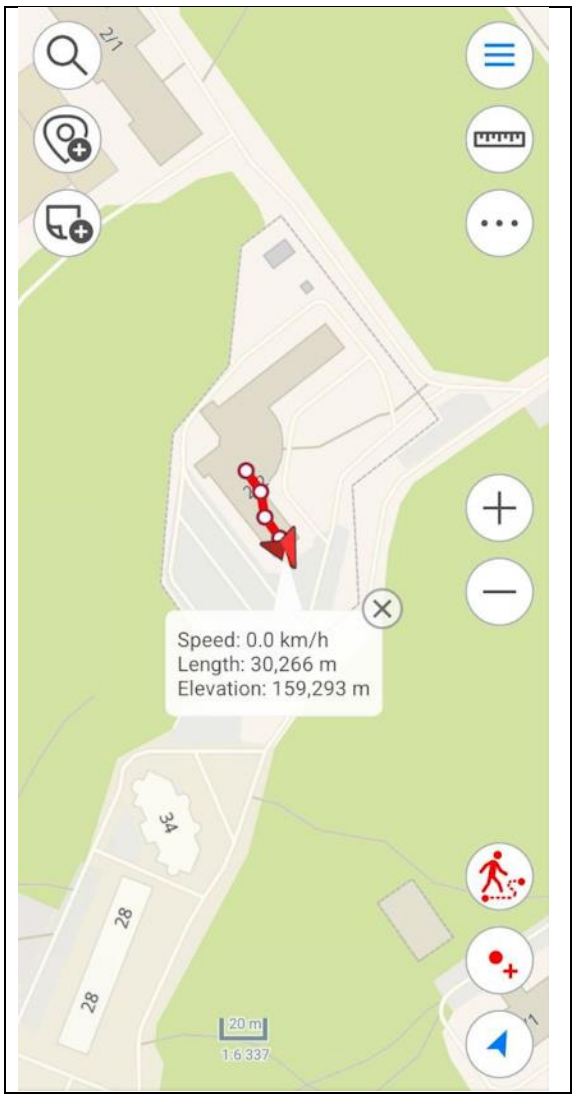
- *Elevation* – the altitude above sea level at the current location point on the map;
- *Coordinates* – the geographic coordinates of the current location point on the map in degrees-minutes-seconds format.



Displaying information from GPS/GLONASS receiver when track recording mode is enabled

While track recording or creating polygon by track mode is enabled, the following information from the device's GPS/GLONASS receiver is displayed on the map:

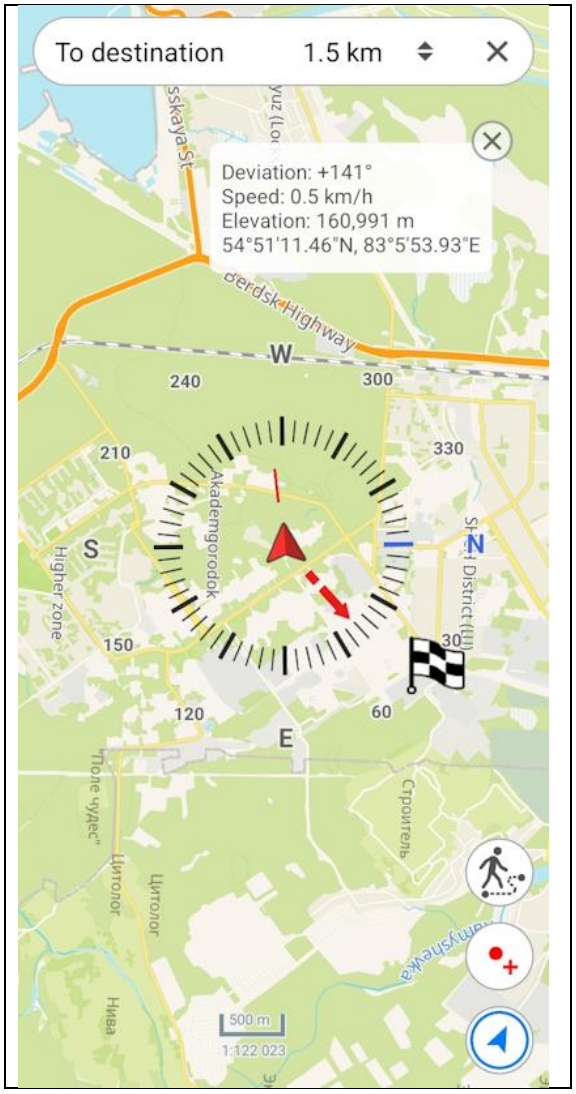
- *Speed* – the information about your movement speed calculated based on your device's GPS/GLONASS receiver data;
- *Length/Area, Perimeter* – the information about geometry of the recorded track/created polygon by track calculated in real time;
- *Elevation* – the altitude above sea level at the current location point on the map.



Displaying information from GPS/GLONASS receiver when the Use as a destination option is enabled

While the *Use as a destination* option is enabled, the following information from the device's GPS/GLONASS receiver is displayed on the map:

- *Deviation* – the information about deviation of the current direction from the destination point;
- *Speed* – the information about your movement speed calculated based on your device's GPS/GLONASS receiver data;
- *Length/Area, Perimeter* – the information about geometry of the recorded track/created polygon by track calculated in real time;
- *Elevation* – the altitude above sea level at the current location on the map;
- *Coordinates* – the geographic coordinates of the current location on the map in degrees-minutes-seconds format.

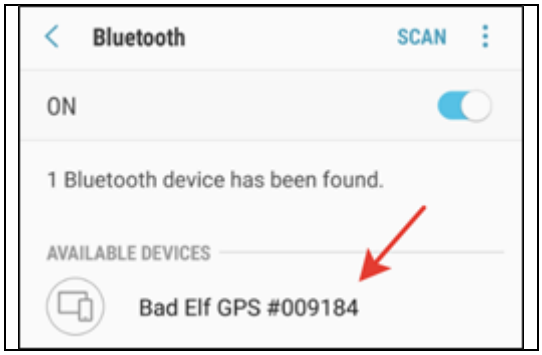


Note that for devices running *Android 14 and above*, the height values at the current location are calculated taking into account the Earth's surface. Using a global geodetic model of the Earth's surface (geoid) increases the accuracy of measurement and reduces errors associated with the relief of the Earth's surface when determining the height at the current location and setting Z-coordinates (height) when creating features and recording tracks.
For devices with *Android version 13 and below*, the height values are still calculated based on GPS/GLONASS receiver data of your device without additional adjustments.

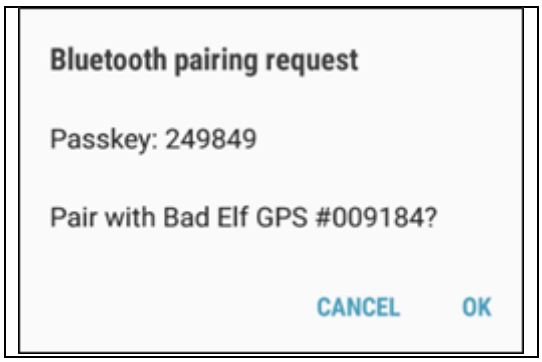
Use external GPS receivers

Starting from version 5.3, CarryMap app supports external GPS receivers from Bad Elf. Using these GPS receivers allows to specify coordinates of your current location more accurately.

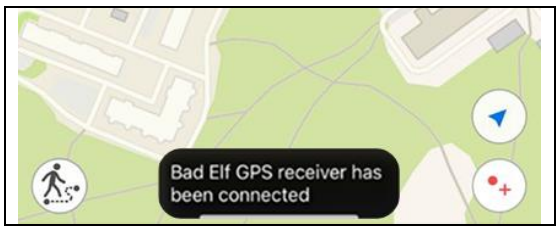
Note that making all settings for Bad Elf GPS option is done outside CarryMap app. To connect Bad Elf receiver, enable Bluetooth on your device and all available receivers will be shown in the appeared list.



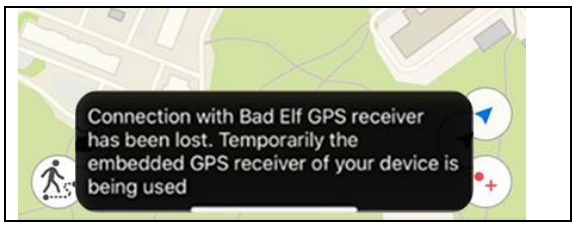
Select the external device and pair it with your mobile device. To do so, select *OK* on your device and on Bad Elf receiver.



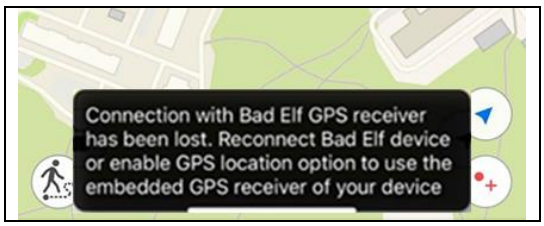
Bad Elf GPS receiver will be connected and you will see the appropriate message.



If by some reason Bad Elf receiver works inappropriately, CarryMap app will automatically use the embedded GPS receiver of your mobile device (if geolocation option is enabled), and the following message will appear.



If geolocation option of your device is disabled and connection with Bad Elf receiver is lost, you will see the following message.



To find your current location and to record tracks, enable geolocation option on your device or check connection with Bad Elf receiver.