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Creating Orienteering Maps with OCAD

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Contents

1 Base Map and Field Work Preparation

1.1 Create the Base Map

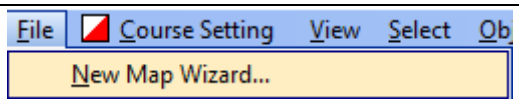
This tutorial describes the workflow how to create a base map with Open Street Map (OSM) data. If you have access to DXF files or Shape files from the area of your map you can also use these files of course. You can import the DXF/Shape files as well. For more information, see our Wiki.

https://www.ocad.com/wiki/ocad/en/index.php?title=Import_Files

1.1.1 Import the Open Street Map

The field work is easier if you have a good base map. Open the OCAD Starter – Edition to create a base map.
You can also use a higher OCAD edition (Orienteering, Mapping Solution) for this tutorial.

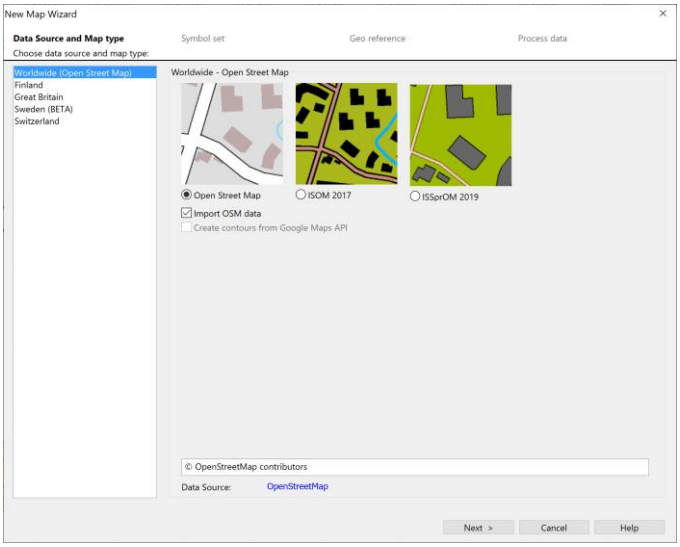
Open the New Map Wizard
File → New Map Wizard



Choose *Open Street Map* as data source and map type.

Make sure to have *Import OSM data* activated.

If you like to create a map in one of the countries listed on the left, you have even better data available than OSM. Find more information on: https://www.ocad.com/wiki/ocad/en/index.php?title=New_Map_Wizard



Load the *Symbol Set for School Orienteering Maps 2019.ocd*. Default scale is 1:1'000.

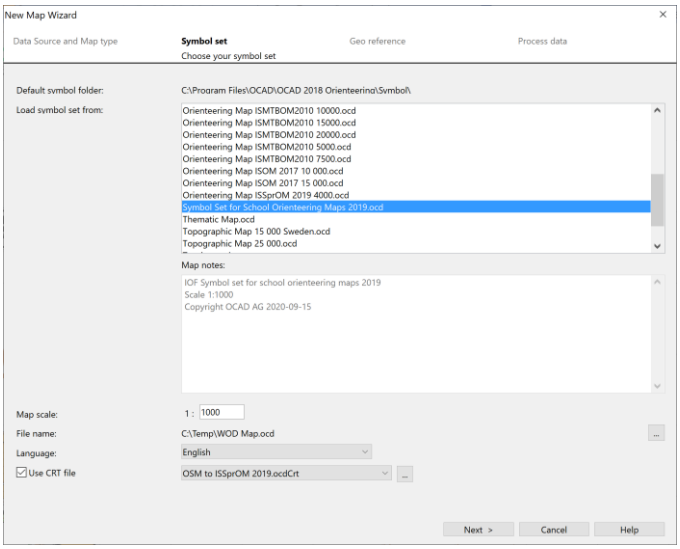
If you like, you can change the scale. Use a full scale like 1:500, 1:1000, 1:1500 or1:2000.

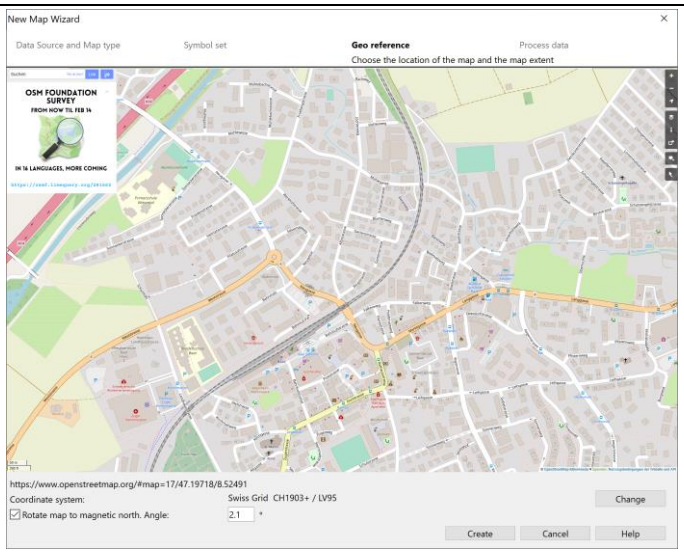
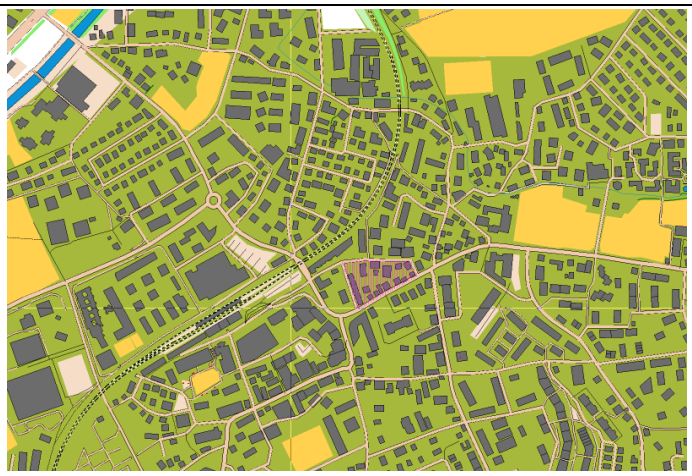
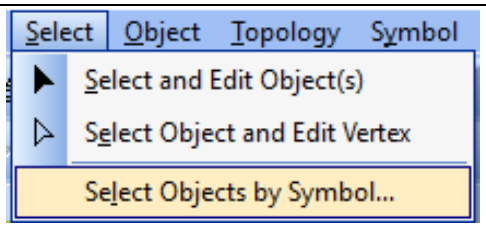
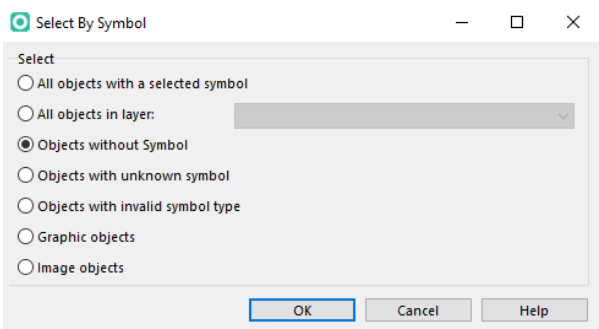
For scales 1:3'000 and 1:4'000, use the *ISSprOM 2019 4000.ocd* symbol set.

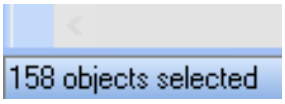
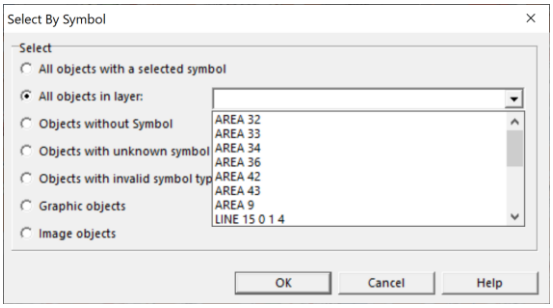
Choose a filename and set the path to the file location.

Also, select a CRT file. This is important so assign OSM symbols directly to OCAD symbols.
User the *OSM to ISSprOm2019.crt* for all scales and symbol sets described above.

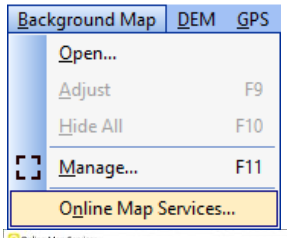
→ Next

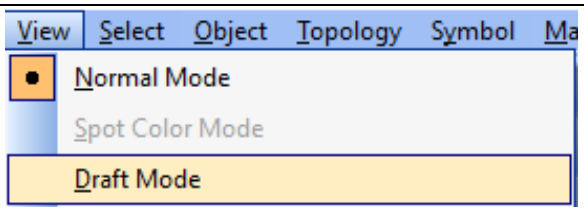
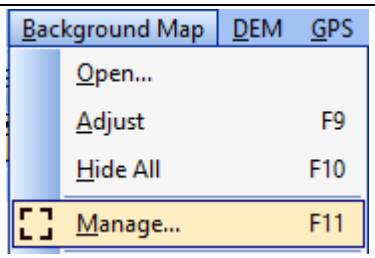
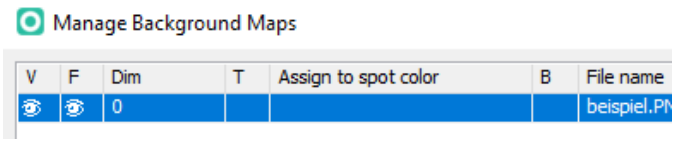


Choose the area of the map by searching your town in the search box in the top left part of the dialog. The perimeter you see in the dialog is getting imported. Change the coordinate system to a local system and rotate map to magnetic north, if it is desired. ***→ Next***	
The map is drawn automatically according to the chosen symbol set with the OSM data. It's a good start for going outside and start mapping. Before you do so, you should check, if there are any objects in your map, that haven't been assigned to a symbol yet. All the objects without a symbol are shown with the color **red**.	
Select → Select Objects by Symbol... Dialog ***Select by Symbol*** Select ***Objects without Symbol → OK*** In the left bottom, you see how many symbols are selected. The goal is to have no selected symbols. But if you have some, zoom into the map and search the selected symbols manually.	 

You can delete these symbols or you change them to an OCAD symbol by using the ***Change Symbol*** icon . Make sure that you change all selected symbols. If you want to only change one, then you have to select it single and reselect the others by the menu. Hint: You can also select and change these objects be choosing *All objects in layer*.	 

1.1.2 Online map Service

In addition to the OSM data, you can load an orthophoto from GoolgeMaps as a background map. ***Background Map → Online Map Service*** Click on the **Update** button to move to Online Map Service to the center of the drawing area. Click **Load as background map** to load the image in the dialogue as background map. As your map is georeferenced, the image will automatically appear at the right spot.	 

You may have to change the **View Mode** to ***Draft Mode*** to see the background map. ***View → Draft Mode*** You can see the background map. A slider bar appears in the *View Toolbar*. There you can change the visibility of the map (M) and the background map (B).	 
Background Map → Manage... The background map at the top of the list will be displayed. You can click in the left column **V** to make the background map visible or not. Check the third column **T** to make a background map transparent. **Open** or **Remove** the background maps with the buttons at the bottom.	 

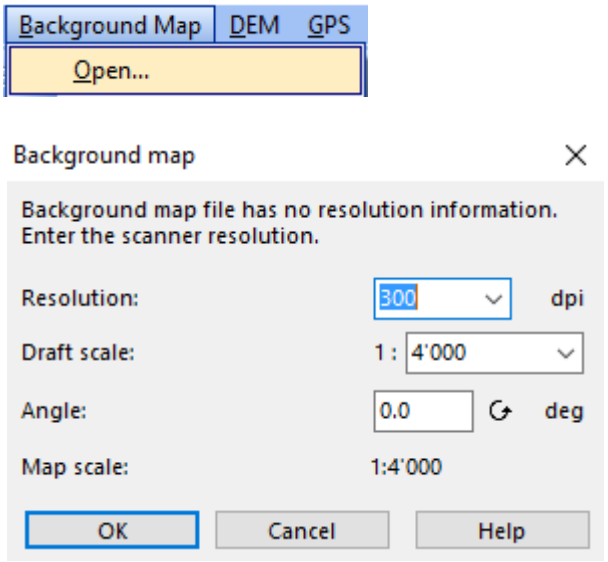
1.1.3 For OCAD Experts: Add Contour Lines Background Maps

You should also have the contour lines on the base map. Find a map with contour lines on the GIS websites of your country, state or town. You can open the map as a background map (supported formats: BMP, GIF, JPEG, PNG, TIFF).

Background Map → Open

If the map is georeferenced click on **→ OK**, else set the *Resolution*, *Draft scale* and the *angle*. **→ OK**

If the map isn't georeferenced, you have to adjust it.



Background Map → Adjust

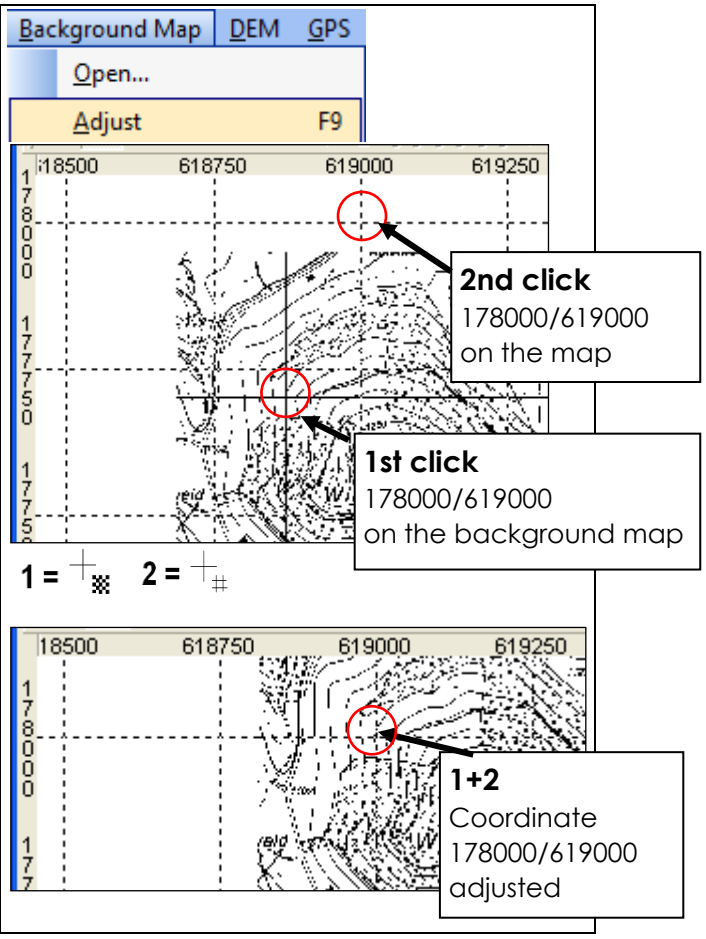
To adjust the background map with the map:

1. Click on a point on the background map
2. Click on the same point on the map

Step 1 and 2 needs to repeated about 3-4 times for an ideal fit.

→ Enter key

The Adjustment is executed after pressing the **Enter** key. The background map is rotated and stretched to get the best fit for the adjustment points.



Now you can redraw the contour lines from the background map.

If you have access to LiDAR data or similar, please see this tutorial:

http://www.ocad.com/wiki/ocad/en/index.php?title=Using_Airborne_Laserscanning_Data_for_Orienteering_Base_Map_Generation

However, to create contours with the DEM Wizard, you need the OCAD Orienteering Edition. With the OCDA WOD Starter Edition, this is not possible.

1.2 Prepare the Base Map and Field Work Tools

For the field work you either do it manually or use a tablet computer.

1.2.1 Prepare the Base Map for Manual Field Work

Print the base map for the field work in a scale that is usually a bit larger than the scale of the map. An appropriate scale for a map with scale 1:2000 is 1:1000. It helps to adjust the scanned field work later if the base map is printed with the grid.

1.2.2 Manual Field Work Tools

You need a carton or a plastic board for the underlay of the field work. It is recommended to cover the printed base map with a film. This makes it easier to change the drawn objects.

A compass is useful to draw the line objects in the right direction from your location. It is recommended to use pointed, colored and probably retractable pencils to draw the features and changes on the film.

1.2.3 Field Work with Tablet computer

An advantage of a tablet computer is that you don't have to redraw your field work at home on the computer. OCAD requires a tablet computer with Windows 7 or higher (32 or 64 bit).

With the OCAD Sketch Layer, OCAD has developed a tool to make field work drawing as ergonomic as possible.

Choose the **Sketch Pen** tool for drawing. Sketch drawing starts with placing the pen on the screen and ends when the pen is lifted from the screen. Click the **Save as Image and Load as Background Map** button to make a PNG file copy of the current sketch features and to load this PNG file as a background map. 	

2 Field Work

2.1 Colors and Symbols

You should use the same colors and symbols on the field work like it would be on the orienteering map, because the interpretation of the field work gets easier like this when you redraw the map on the computer.

2.1.1 Point Symbols

For the point symbols like knolls, stones, pits, trees and fountains use the IOF – Symbols. But there are other special symbols for the school yard map like a street lamp, flagpole, climbing pole or a bench. Take a look in OCAD to see the available symbols. You can also map additional symbols, if you think it is necessary.

2.1.2 Line Symbols

For the line symbols use also the IOF – Symbols from the orienteering map. You can use the lines for other objects like the distinct vegetation boundary for the edge of a place, a sea outline for an edge of a street or an impassable cliff for an impassable wall.

2.1.3 Area Symbols

To understand the finished map better, take different colors to draw the facilities, places, paths and streets. Take colors that are typical for the facility (e.g. athletics track → **red**).

It is important to see for the runners if the line and area symbols are passable or not.

2.2 Procedure

2.2.1 Step measure

It is more important to draw the object right relative to the others than exactly true-to-location. It is enough to measure it with steps. You can train on a 100-meter track or another track with known length to have a step measure of 1 meter,

2.2.2 Point Symbols

You locate the point symbols with the help of the step measure and the compass. Also, a help is the vanishing point of buildings. Objects that are difficult to locate should be measured with the compass from various points:

- Known position
- Draw a line in the right position that you have measured with your compass.
- Take another known position that is 60°-90° degrees away of the first position.
- Take a third position to have a control.
- Three lines should be intersected at one point. There is the location of the object.

2.2.3 Line and Area Symbols

The most line and area symbols are already on your base map, but if there is a building or track that isn't on the map, you have to draw it. Take a known position

and draw the direction of the line symbol with the compass. Take the length of the object by the step measure and so on. Do the same for area features by following their border.

2.2.4 Contour Lines

It is possible that the contour lines on the base map do not represent the relief very well. You are free to move them to get a better terrain representation. You can also use a form line to show the relief between two contour lines.

3 Digitize the Field Work

3.1 Scan Field Work

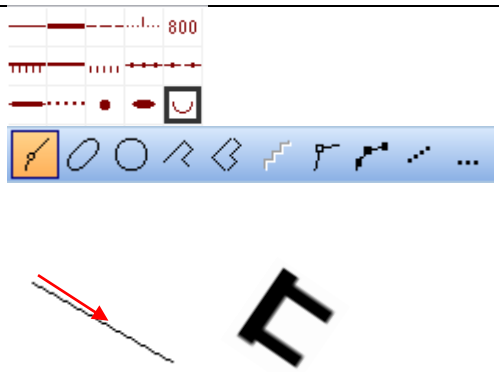
Scan your field work and save it in a raster format (JPG, TIFF, PNG). Open the field work as a background map like it is explained further above.

3.2 Draw an Object

In these tutorials are only the basic explained. If you want to know more, you can look on the OCAD Wiki or take a look at this document:
https://www.ocad.com/docs/Drawing_Orienteering_Maps_in_OCAD.pdf

It is recommended to draw the point and line objects first and at the end the area objects, because they cover the background map.

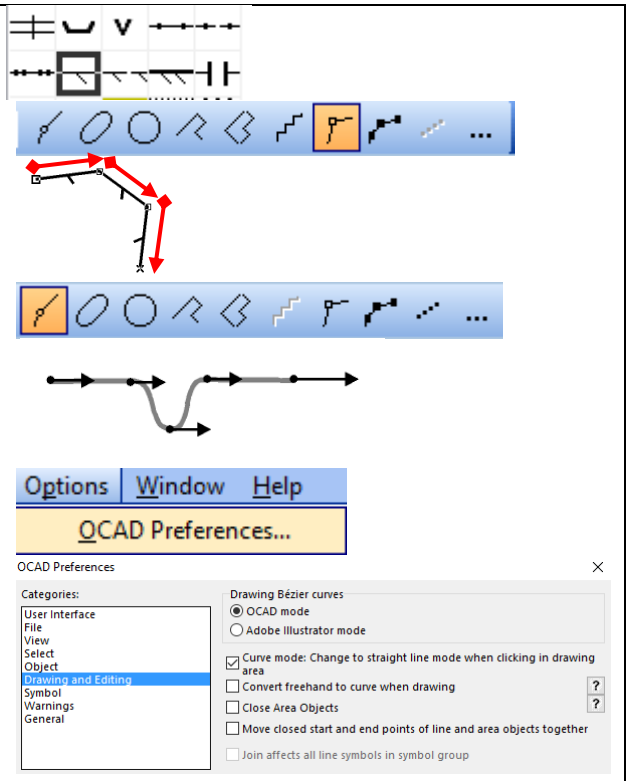
3.2.1 Draw a Point Object

To draw a point object, choose a point symbol in the *symbol box* and click on it. Select any drawing mode and click in the *drawing area*. The object is orientated to the north by default. If you want to orientate it, click and drag to a direction while drawing the object.	

3.2.2 Draw a Line Object

Choose a line symbol in the *symbol box*.
Now you have different options to draw the lines.

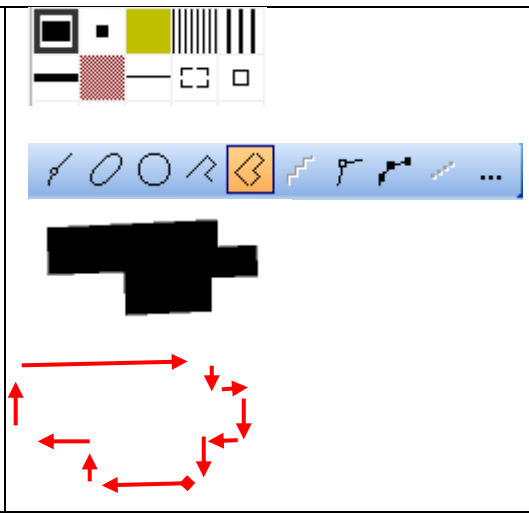
1. Take the ***Straight Line Mode***, if you want to draw straight lines. Click and hold the mouse button to draw a line.
2. Take the ***Curve Mode*** to draw a curve. Click in the drawing area and move the cursor to draw the tangent on the line and release the mouse button. Click on the next point to add a vertex.
3. You can draw with a mix between the ***Curve Mode*** and the ***Straight Line Mode***.
   Options → OCAD Preferences...
   Categories: ***Drawing and Editing***
   Select the ***Curve mode: change to straight line mode when clicking in drawing area.***
   Select the ***Curve Mode***.
   If you drag the mouse, you are drawing a curve and if you click without dragging, you draw a straight line.

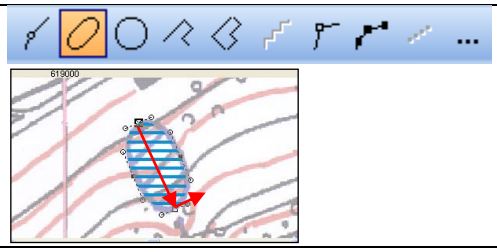


3.2.3 Draw an Area Object

Choose an area object in the *symbol box*.
You have different options to draw the areas.

1. Take an option of the line modes.
2. Select the ***Rectangular Mode***: Click on the first corner of the area. Hold the mouse button, drag the cursor along the longer side to the next corner and release the mouse button.
3. Select the ***Circle*** or the ***Ellipse Mode:*** Click on the edge of the



area and drag the mouse button to the other side and release it. If you want to draw an area you have to click again and drag along the other axis.	

3.2.4 Tips to draw

You also can follow existing objects, fill it, or continue an existing object. Have a look at the Tutorial *Drawing Orienteering Maps in OCAD* for better understanding.

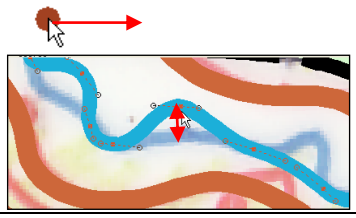
3.3 Edit Objects

To edit an object, there are many edit tools.

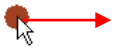
Select and Edit Object(s) e.g. move an object

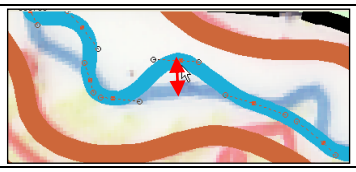
Select Object and Edit Vertex e.g. insert, move, remove a vertex

3.3.1 Move Objects/Vertexes

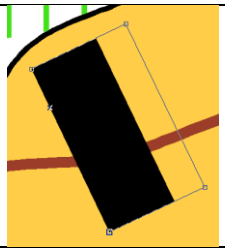
1. Select the **Select and Edit Object(s)** icon to move an object. Select the **Select Objects and Edit Vertex** icon to move a vertex. 2. Click on the object/vertex 3. Move the object/vertex to the new position with the left mouse button pressed. Release the left mouse button to complete.	 Object  Vertex 

3.3.2 Move Objects/Vertexes

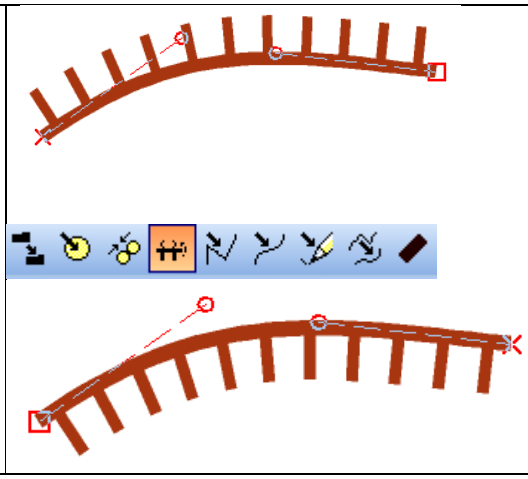
1. Select the **Select and Edit Object(s)** icon to move an object. Select the **Select Objects and Edit Vertex** icon to move a vertex. 2. Click on the object/vertex 3. Move the object/vertex to the	 Object  Vertex 

new position with the left mouse button pressed. Release the left mouse button to complete.	

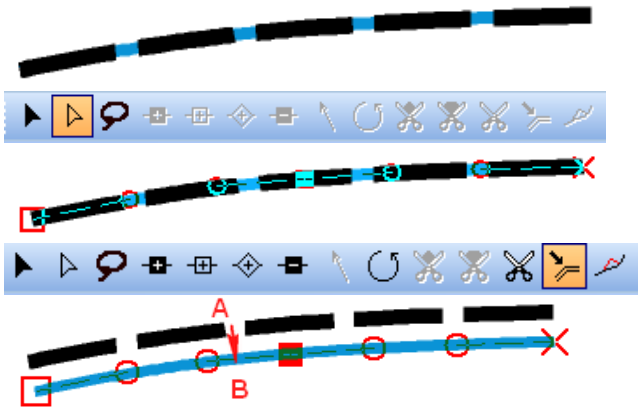
3.3.3 Move Segments

To move two vertexes together, click between the vertexes and move it with the pressed left mouse button to the new position.	

3.3.4 Reverse Object Direction

Select the **Select Objects and Edit Vertex** icon in the **Edit and Drawing Toolbar**. 1. Click on the object. 2. Select the **Reverse Object** icon in the **Edit Function Toolbar**.	

3.3.5 Move Parallel

1. Draw the watercourse following the existing track. 2. Select the **Select Objects and Edit Vertex** icon in the **Edit and Drawing Toolbar**. 3. Click on the drawn object. 4. Select the **Move Parallel** icon in the **Edit and Drawing Toolbar**. Click on a vertex on the watercourse **(A)** and move it away from the track with the pressed left mouse button **(B)**.	

4 Layout, Print and Export

4.1 Layout

The following information should appear on the map:

- Name of the map
- Scale
- Equidistance
- Date
- Map issuer
- Name of the mapper
- North Lines and North Arrow
- Legend
- Logos

4.2 Print and Export

You have the possibility to export or print your map.

→ ***File*** → ***Print*** to print your map directly from the OCAD.

→ ***File*** → ***Export*** to export your map as a PDF or other formats.

5 Sample Map


SCHULHAUS
WINDBÜHLMATTE
Massstab 1:1000
Stand Juli 2019
Kartografie Ueli Schlatter, Zollbrück
OLG Scandia
0 10 20 30 40 50
Meter
Legende
Wiese, Rasen
Sandplatz
Privatgebiet
Hecke
Baum, Busch
Kunststoffbelag
befestigter Platz
Gebäude
Überdachung, Pfeiler
Treppe
Strassenlampe
Scheinwerfer
Basketballständer
Abfallbehälter
Stein
Spielgerät
Tunnel
Tisch
Sitzbank
hoher Zaun
Zaun
hohe Mauer
Mauer
kleiner Wassergraben
Brunnen
Hydrant, Handpumpe