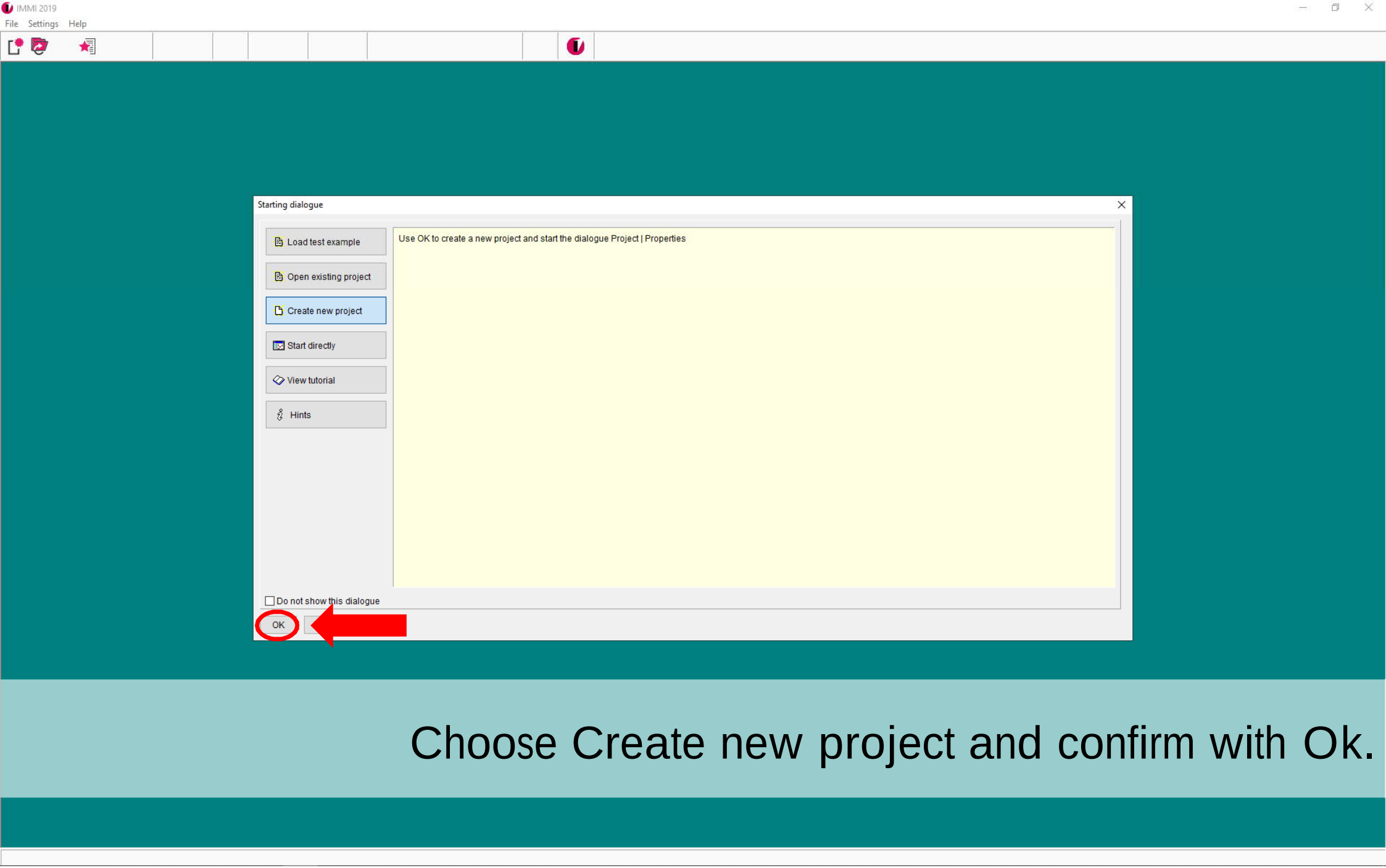
IMMI – Calculation of Aircraft Noise According CNOSSOS-EU (Directive (EU) 2015/996)

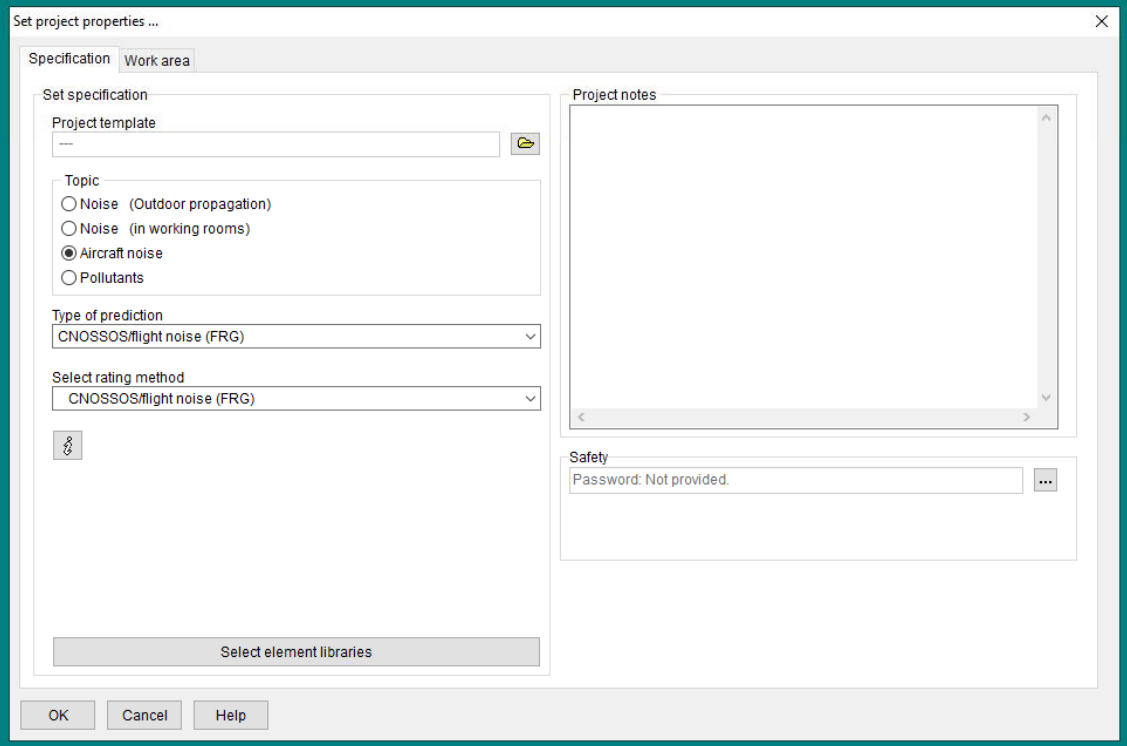
Wölfe

The aim of this tutorial is to provide you with an introduction to setting up a project according to the CNOSSOS-EU guideline for aircraft noise.

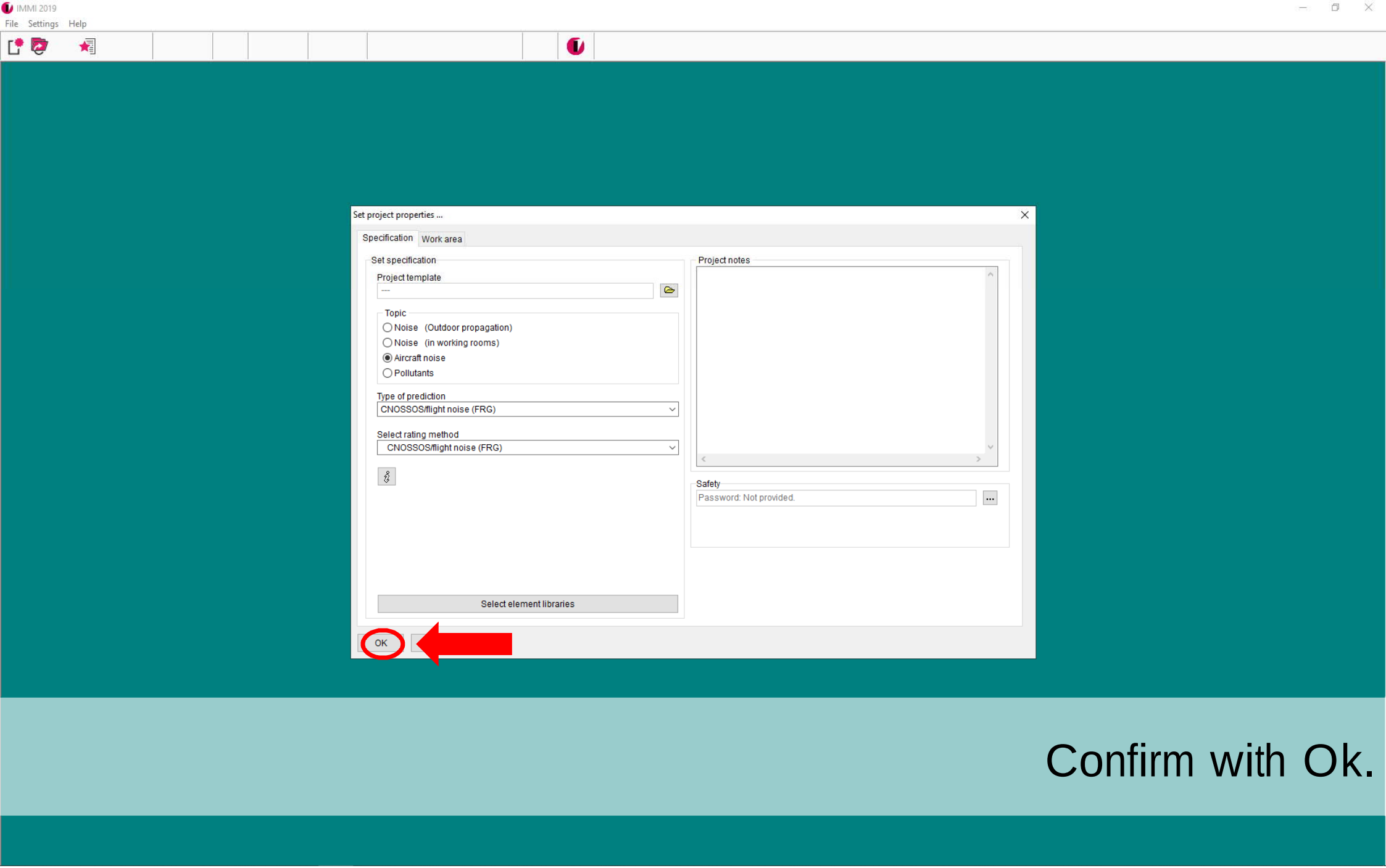
The basis for this project is using the data interface QSI according to DIN 45687. An example is stored in the IMMI installation folder, see Exampleprojects \ Aircraft noise. This tutorial is based on the guideline CNOSSOS-EU.



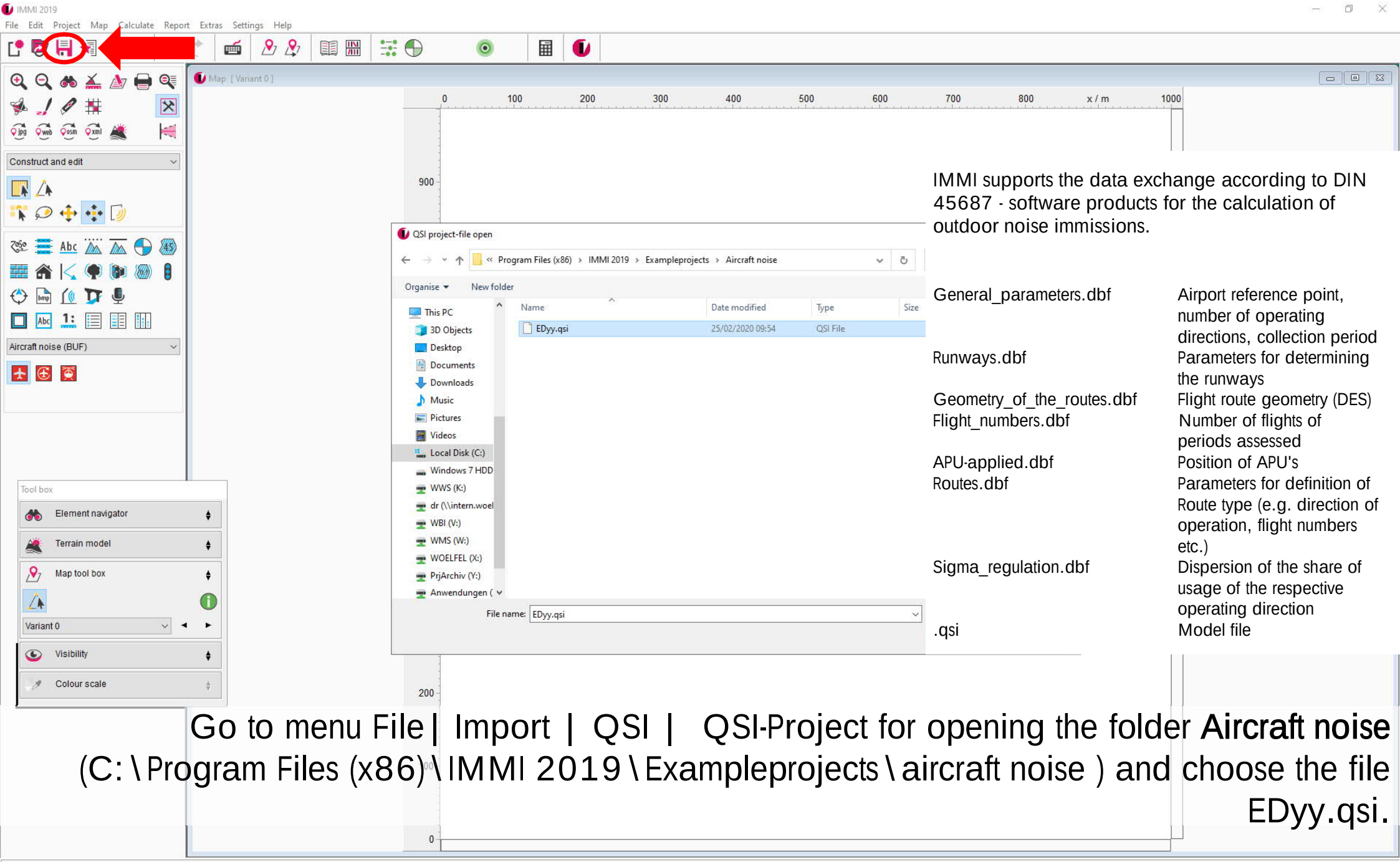
Choose Create new project and confirm with Ok.



In the dialog box Set project properties …: for the topic choose Aircraft noise and for type of prediction and for the rating method choose CNOSSOS/flight noise (FRG).



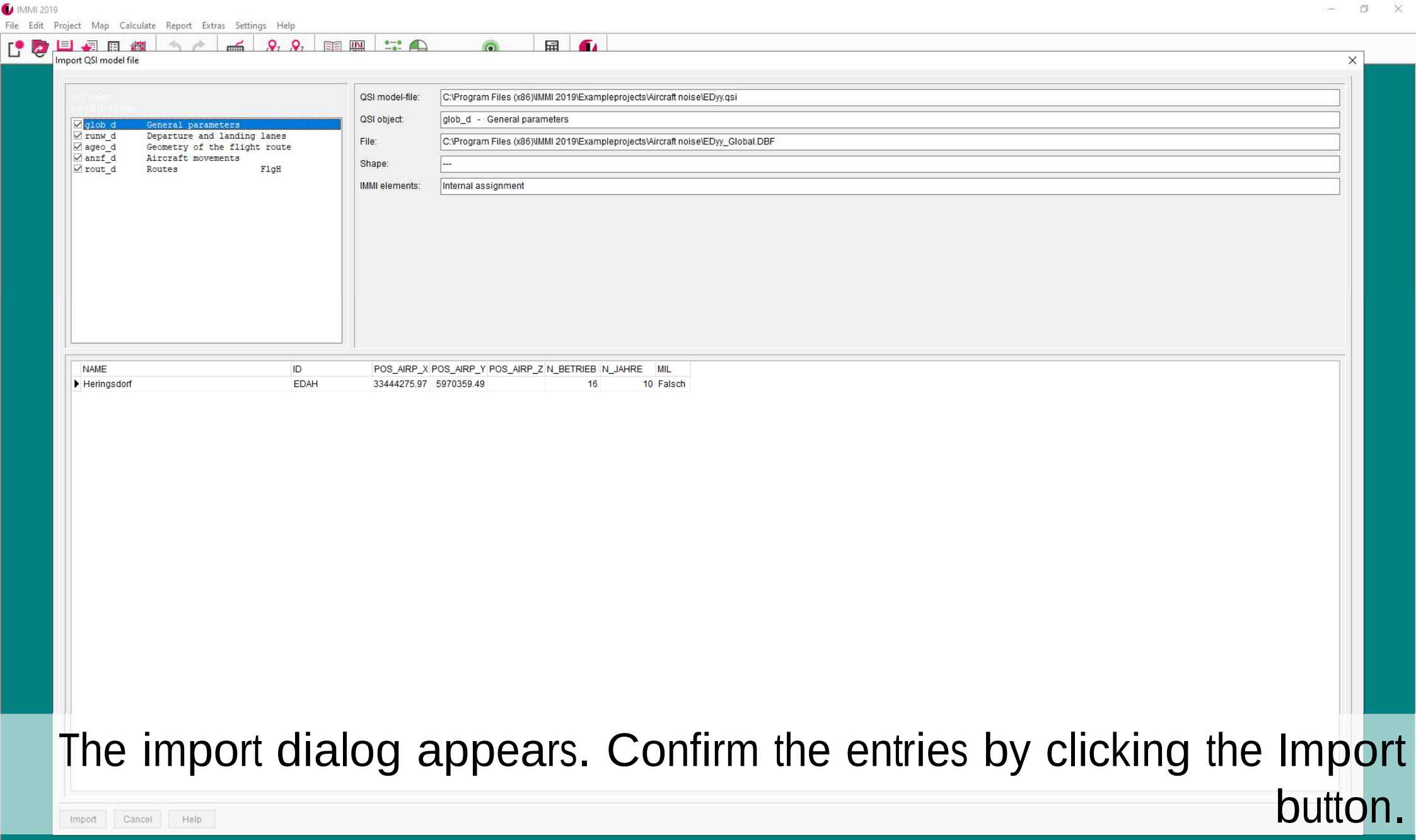
Confirm with Ok.



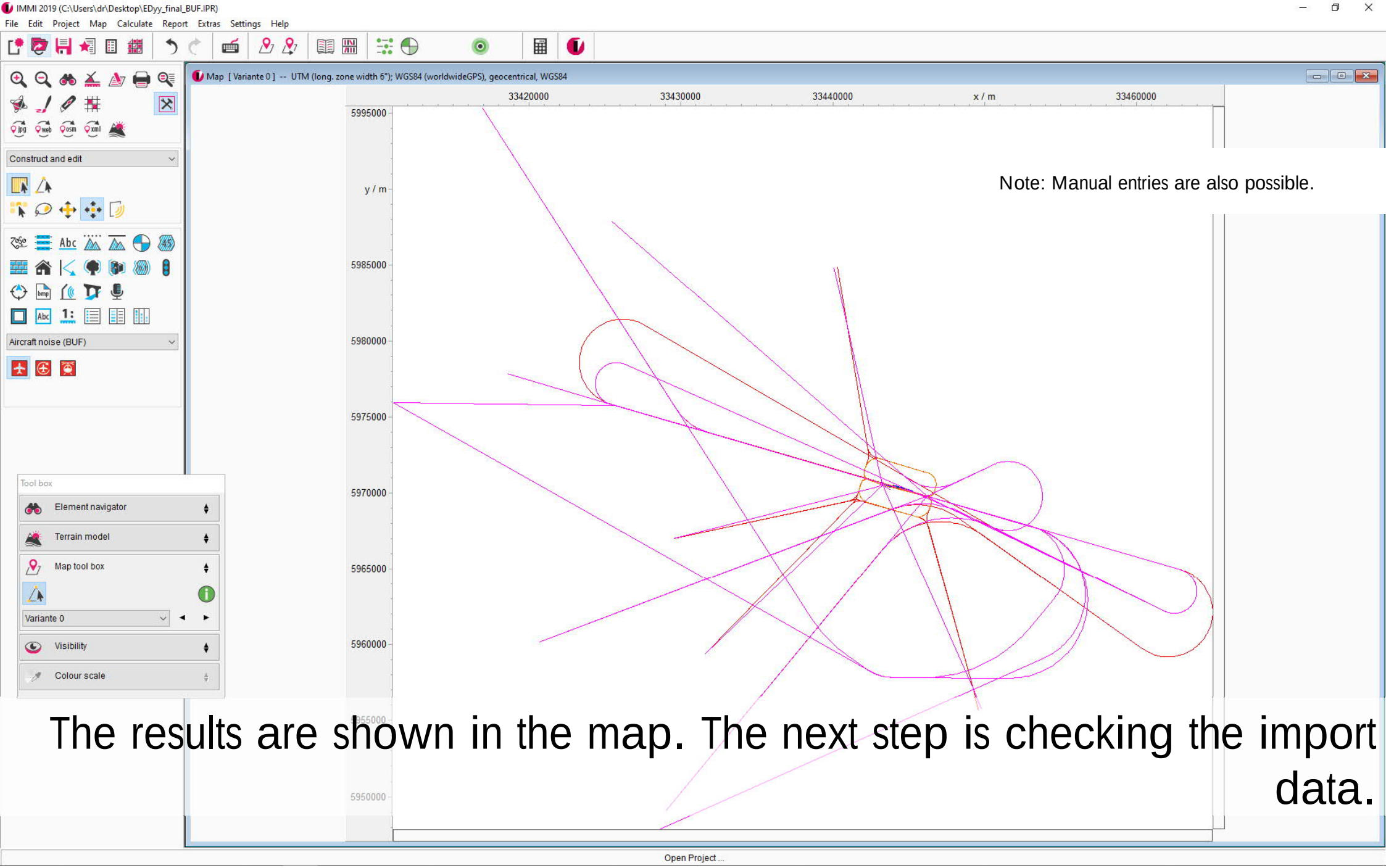
IMMI supports the data exchange according to DIN 45687 - software products for the calculation of outdoor noise immissions.

General_parameters.dbf	Airport reference point, number of operating directions, collection period
Runways.dbf	Parameters for determining the runways
Geometry_of_the_routes.dbf	Flight route geometry (DES)
Flight_numbers.dbf	Number of flights of periods assessed
APU-applied.dbf	Position of APU's
Routes.dbf	Parameters for definition of Route type (e.g. direction of operation, flight numbers etc.)
Sigma_regulation.dbf	Dispersion of the share of usage of the respective operating direction
.qsi	Model file

Go to menu File | Import | QSI | QSI-Project for opening the folder **Aircraft noise** (C:\Program Files (x86)\IMMI 2019\Exampleprojects\aircraft noise) and choose the file EDyy.qsi.

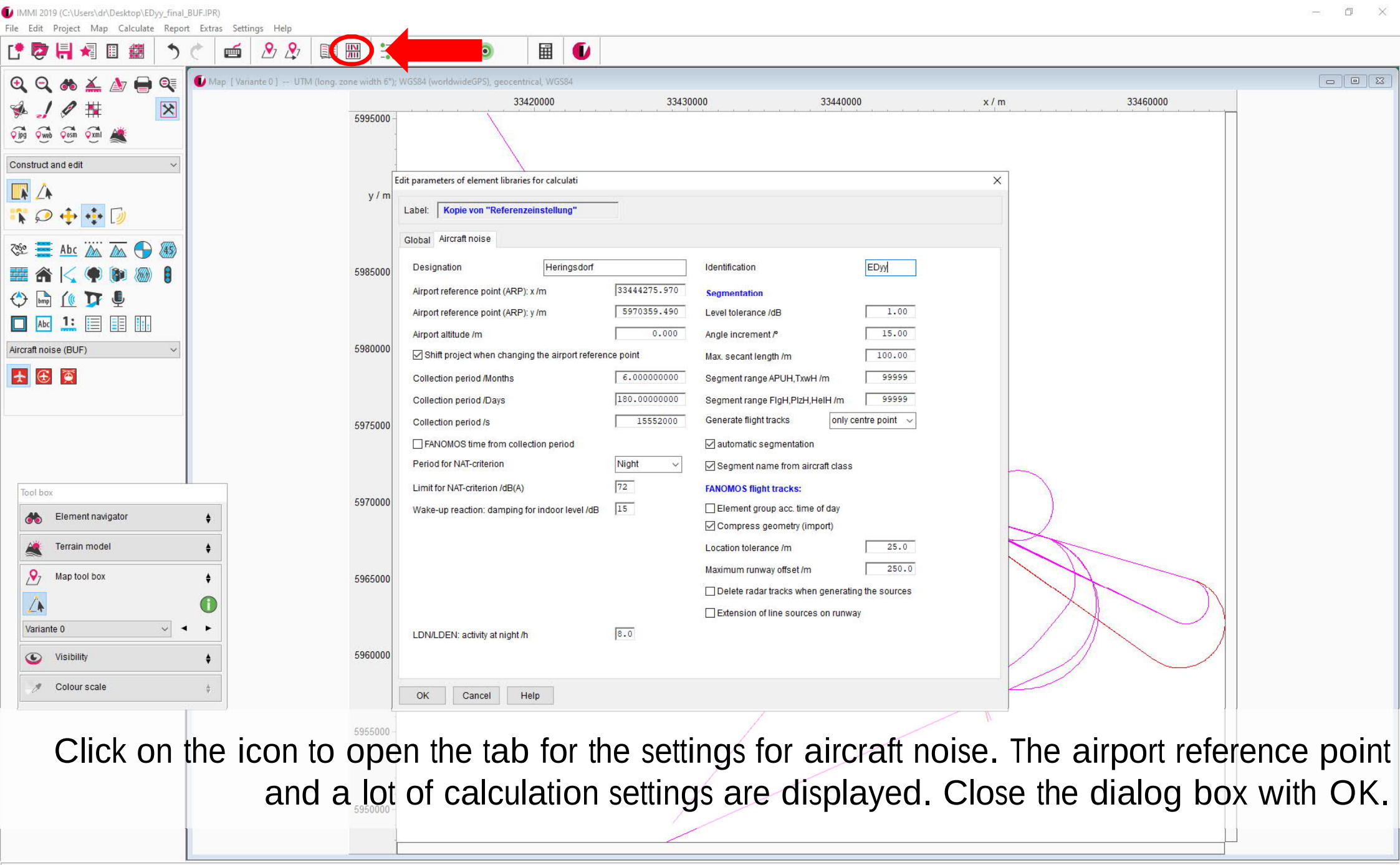


The import dialog appears. Confirm the entries by clicking the Import button.

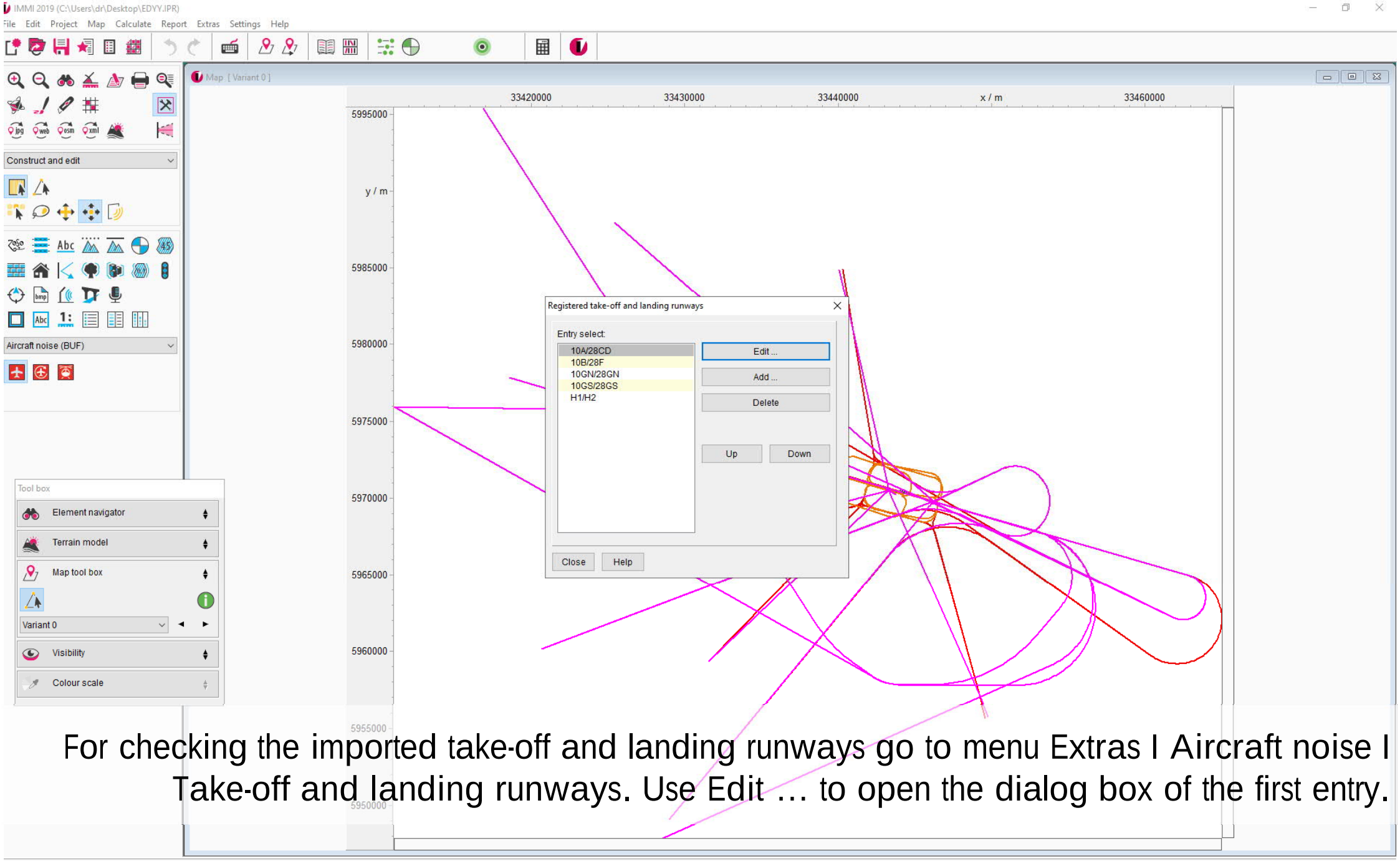


Note: Manual entries are also possible.

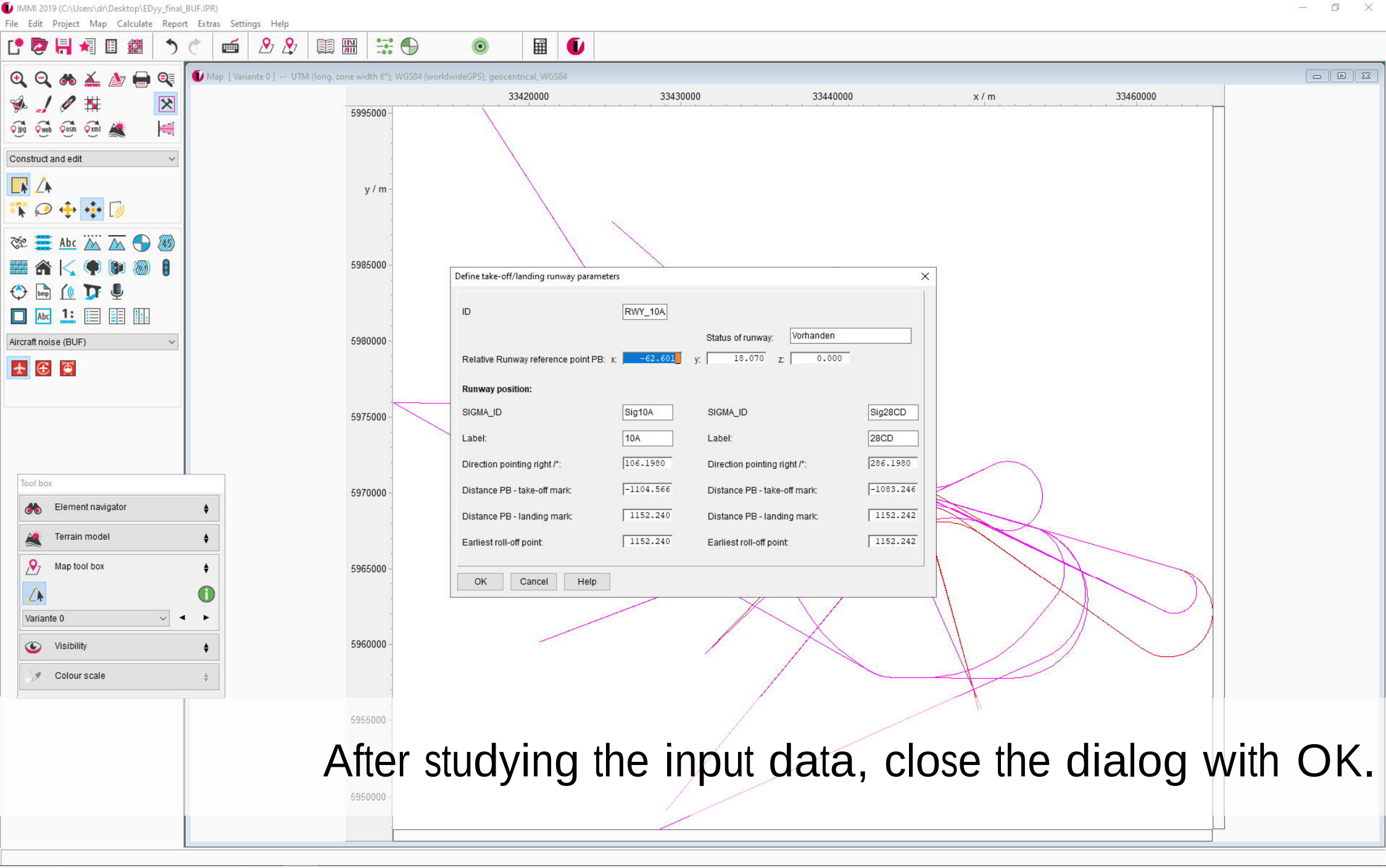
The results are shown in the map. The next step is checking the import data.



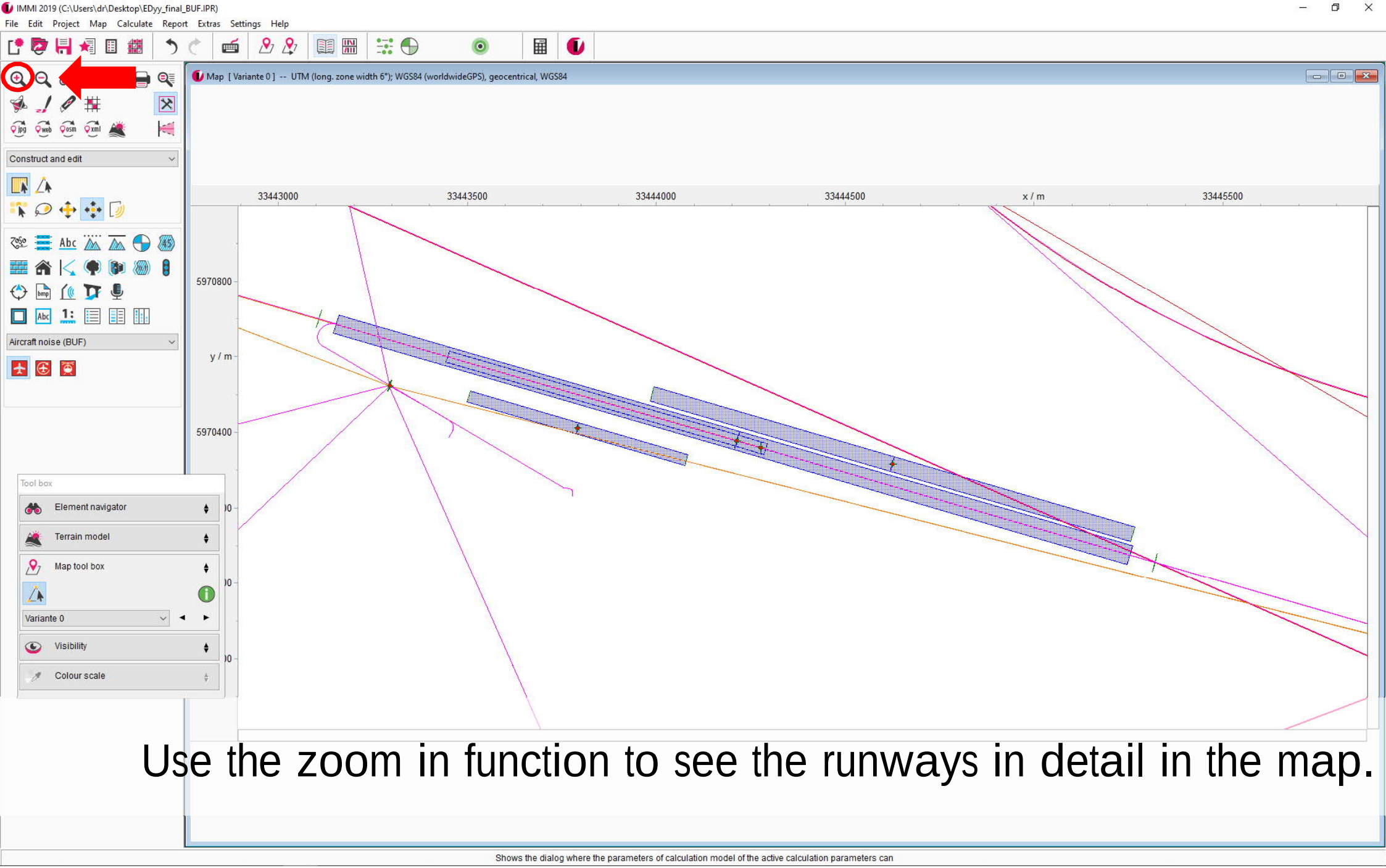
Click on the icon to open the tab for the settings for aircraft noise. The airport reference point and a lot of calculation settings are displayed. Close the dialog box with OK.



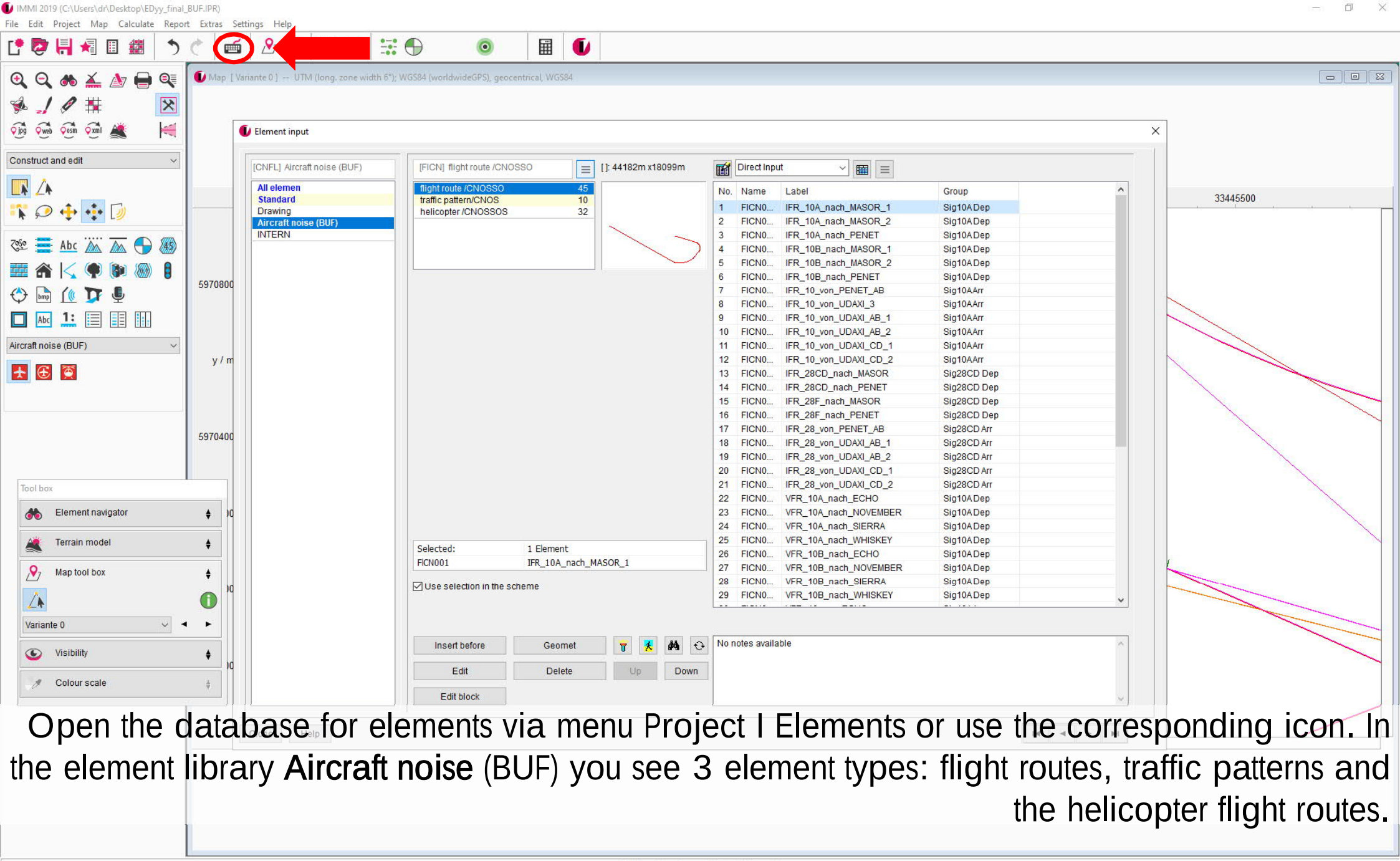
For checking the imported take-off and landing runways go to menu Extras I Aircraft noise I Take-off and landing runways. Use Edit … to open the dialog box of the first entry.



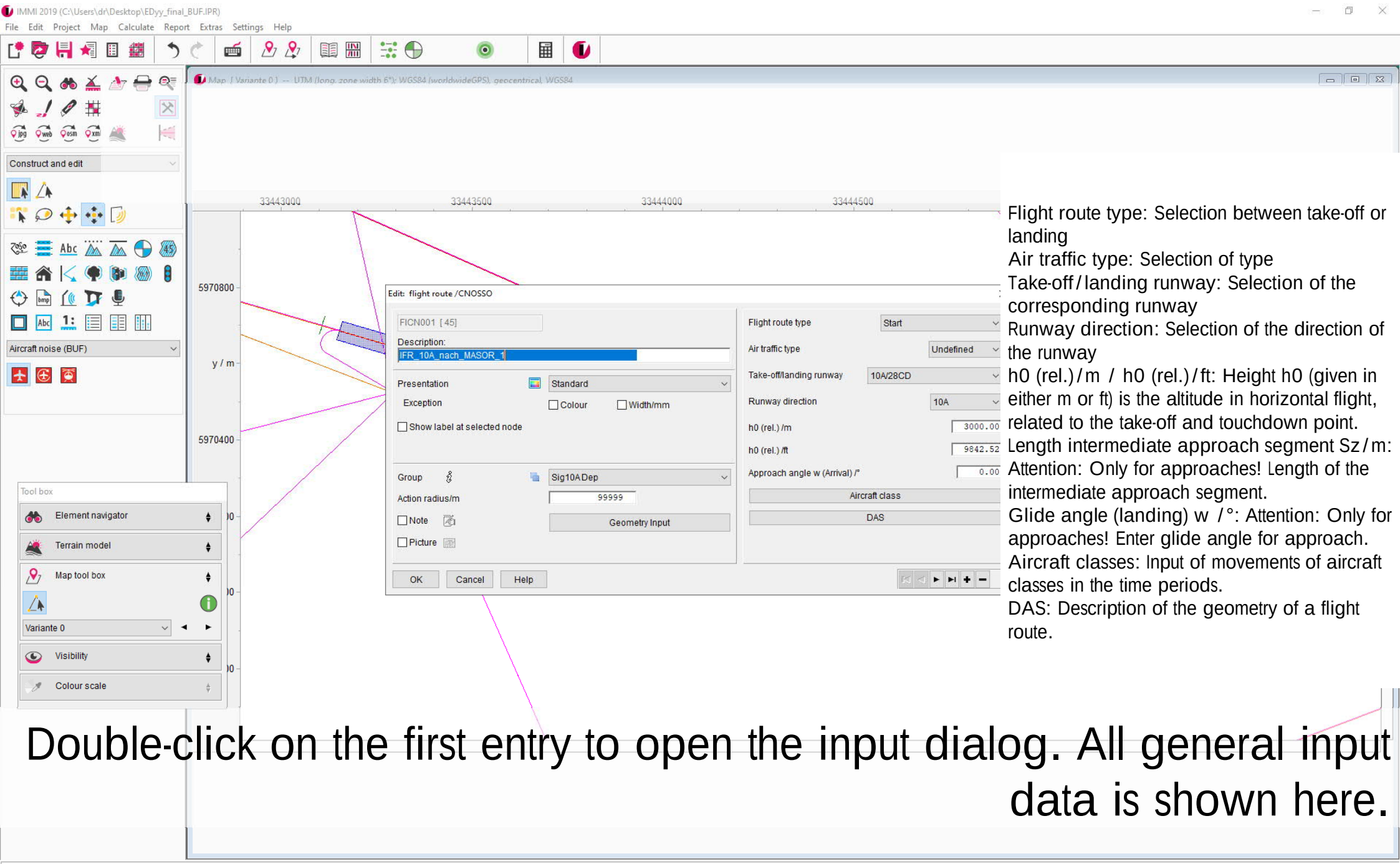
After studying the input data, close the dialog with OK.



Use the zoom in function to see the runways in detail in the map.

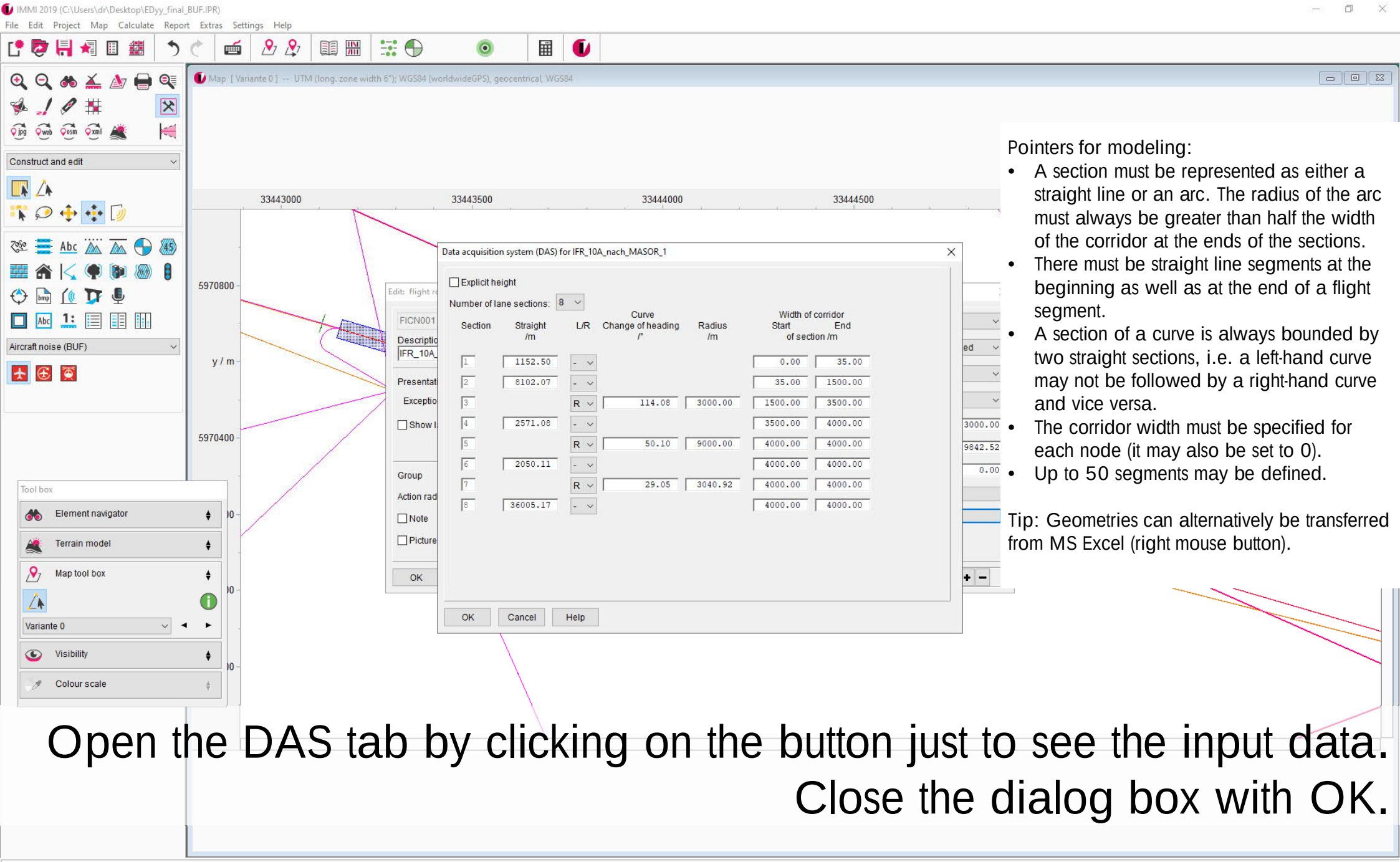


Open the database for elements via menu Project I Elements or use the corresponding icon. In the element library **Aircraft noise** (BUF) you see 3 element types: flight routes, traffic patterns and the helicopter flight routes.



Flight route type: Selection between take-off or landing
Air traffic type: Selection of type
Take-off/landing runway: Selection of the corresponding runway
Runway direction: Selection of the direction of the runway
h0 (rel.)/m / h0 (rel.)/ft: Height h0 (given in either m or ft) is the altitude in horizontal flight, related to the take-off and touchdown point.
Length intermediate approach segment Sz/m: Attention: Only for approaches! Length of the intermediate approach segment.
Glide angle (landing) w /°: Attention: Only for approaches! Enter glide angle for approach.
Aircraft classes: Input of movements of aircraft classes in the time periods.
DAS: Description of the geometry of a flight route.

Double-click on the first entry to open the input dialog. All general input data is shown here.

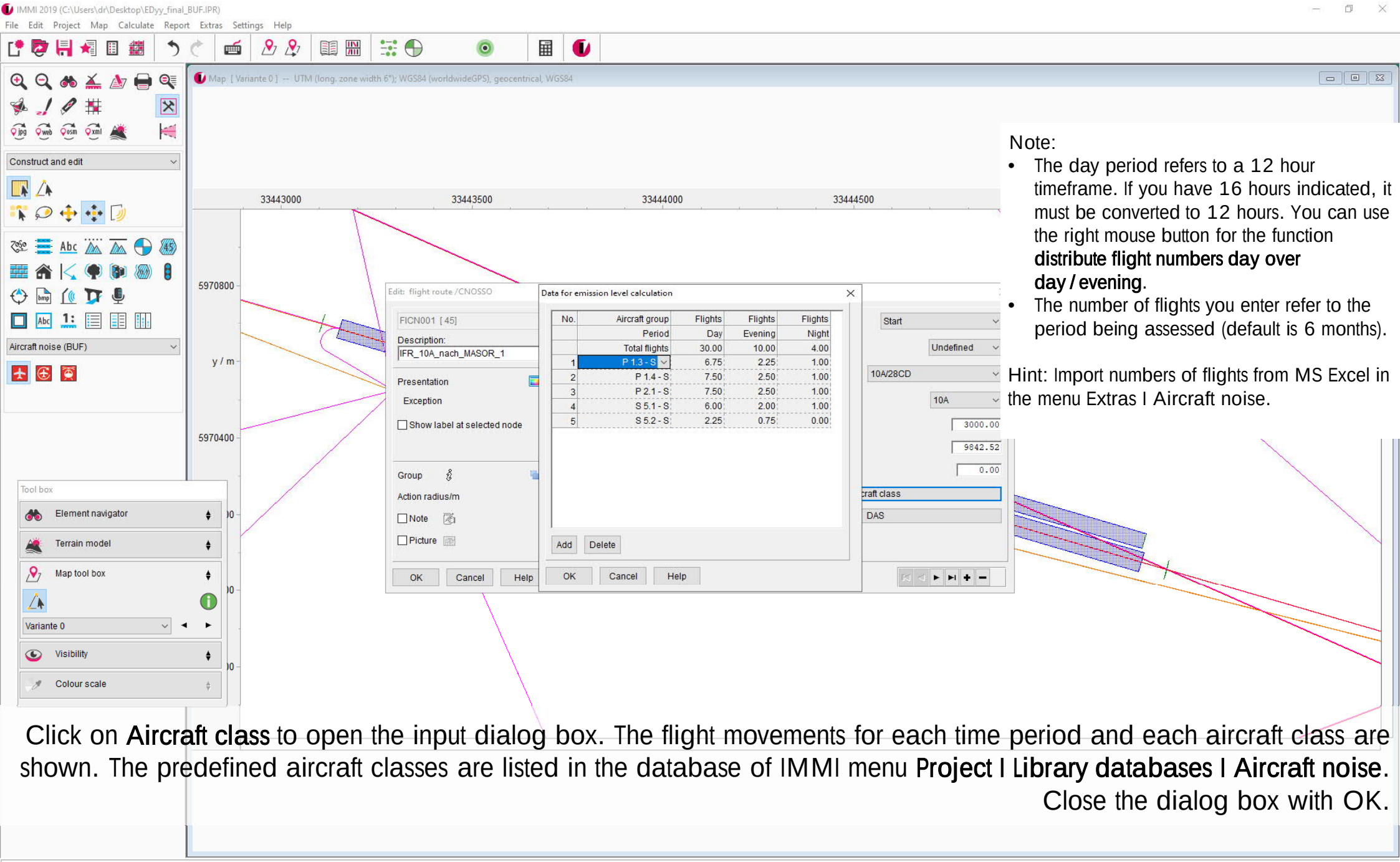


Pointers for modeling:

- A section must be represented as either a straight line or an arc. The radius of the arc must always be greater than half the width of the corridor at the ends of the sections.
- There must be straight line segments at the beginning as well as at the end of a flight segment.
- A section of a curve is always bounded by two straight sections, i.e. a left-hand curve may not be followed by a right-hand curve and vice versa.
- The corridor width must be specified for each node (it may also be set to 0).
- Up to 50 segments may be defined.

Tip: Geometries can alternatively be transferred from MS Excel (right mouse button).

Open the DAS tab by clicking on the button just to see the input data.
Close the dialog box with OK.

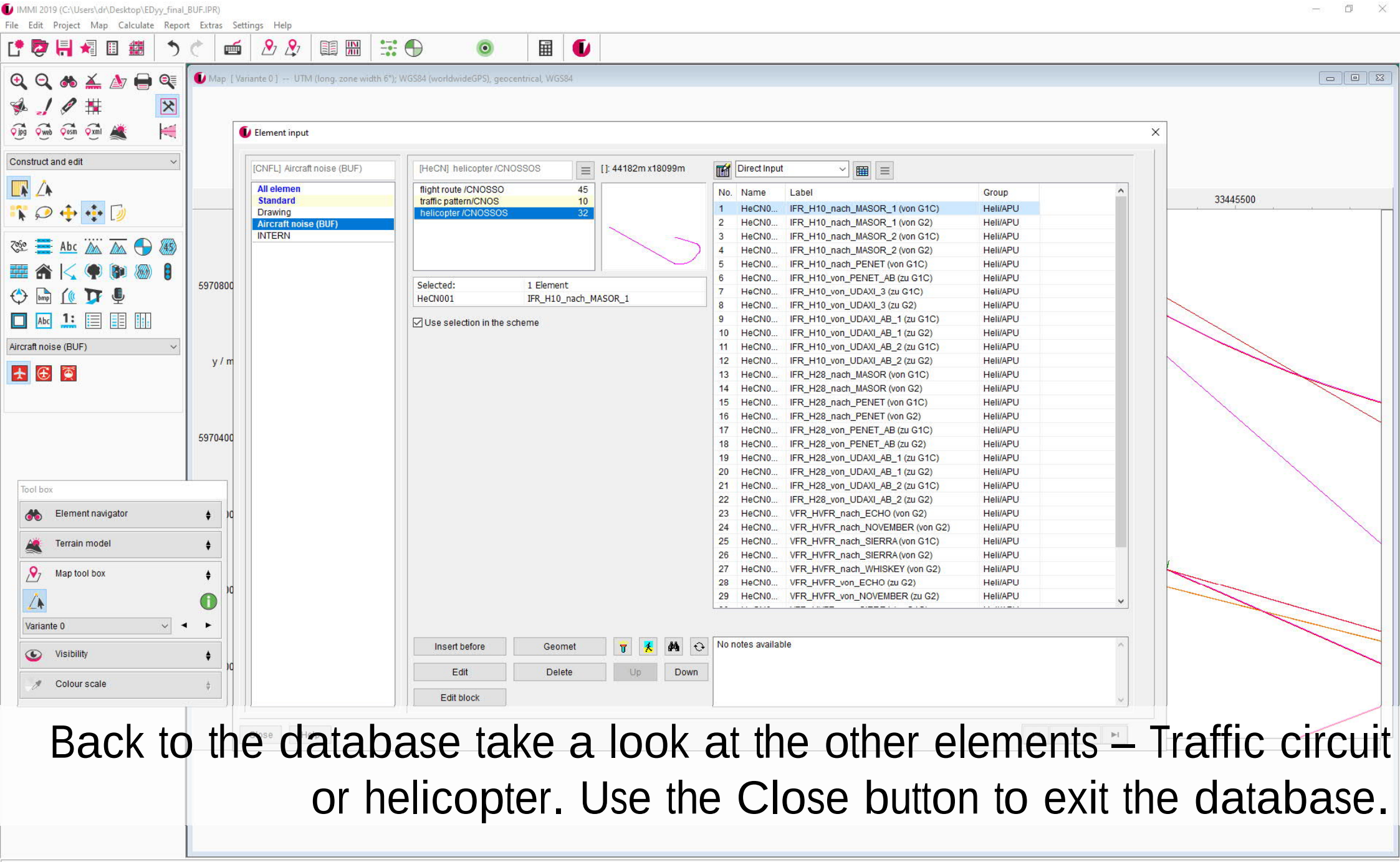


Note:

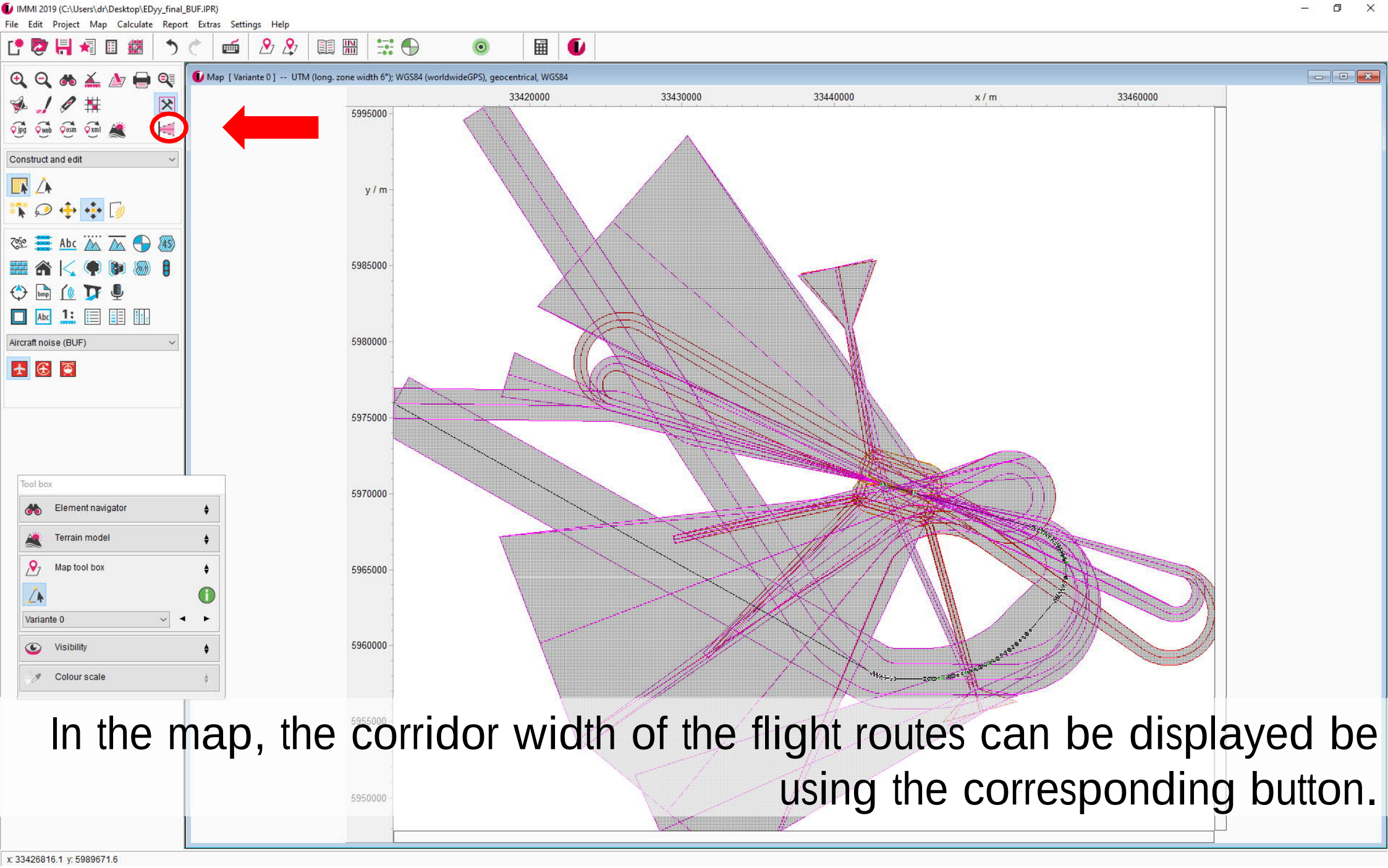
- The day period refers to a 12 hour timeframe. If you have 16 hours indicated, it must be converted to 12 hours. You can use the right mouse button for the function **distribute flight numbers day over day / evening**.
- The number of flights you enter refer to the period being assessed (default is 6 months).

Hint: Import numbers of flights from MS Excel in the menu Extras I Aircraft noise.

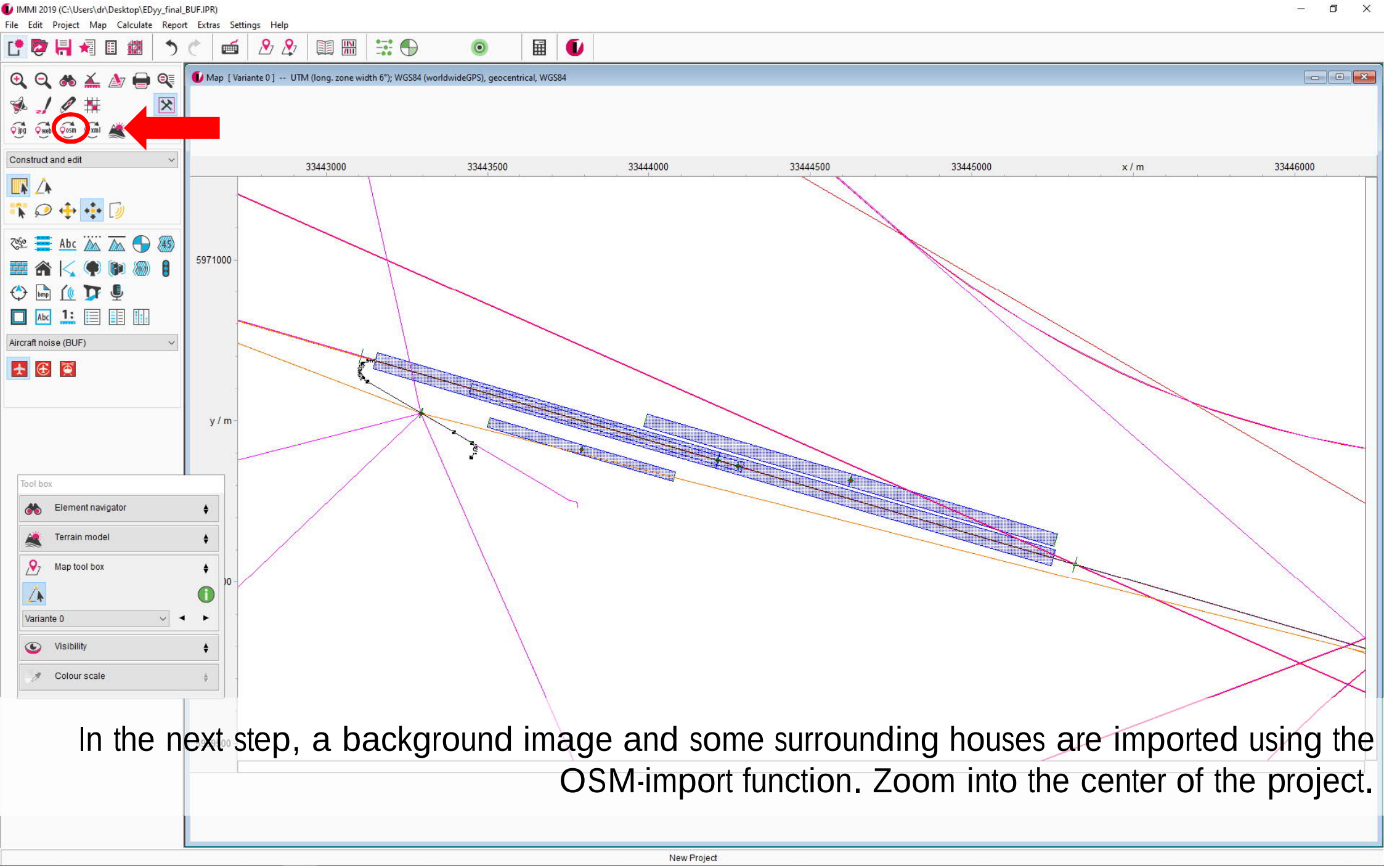
Click on **Aircraft class** to open the input dialog box. The flight movements for each time period and each aircraft class are shown. The predefined aircraft classes are listed in the database of IMMI menu **Project I Library databases I Aircraft noise**. Close the dialog box with OK.



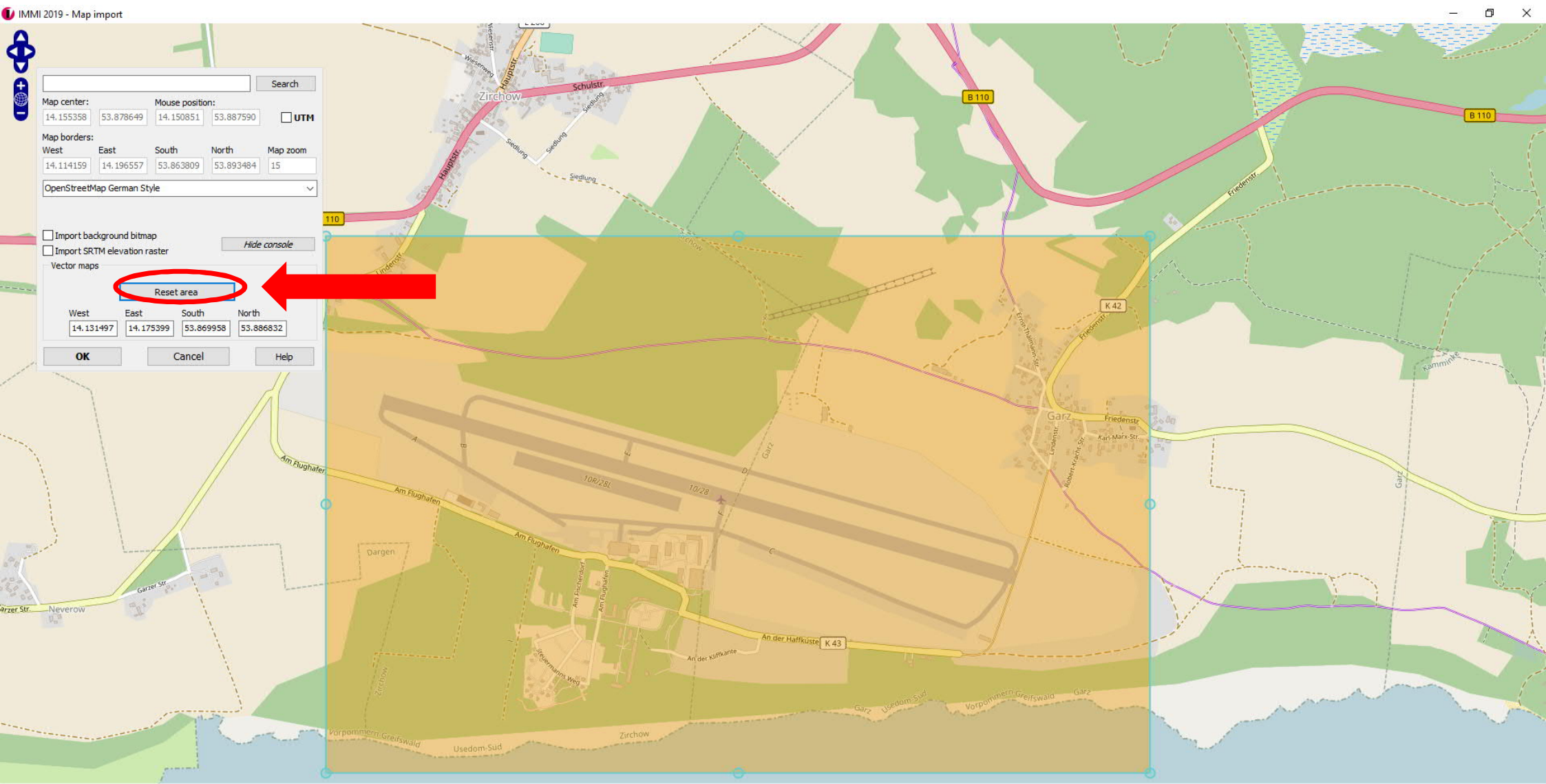
Back to the database take a look at the other elements – Traffic circuit or helicopter. Use the Close button to exit the database.



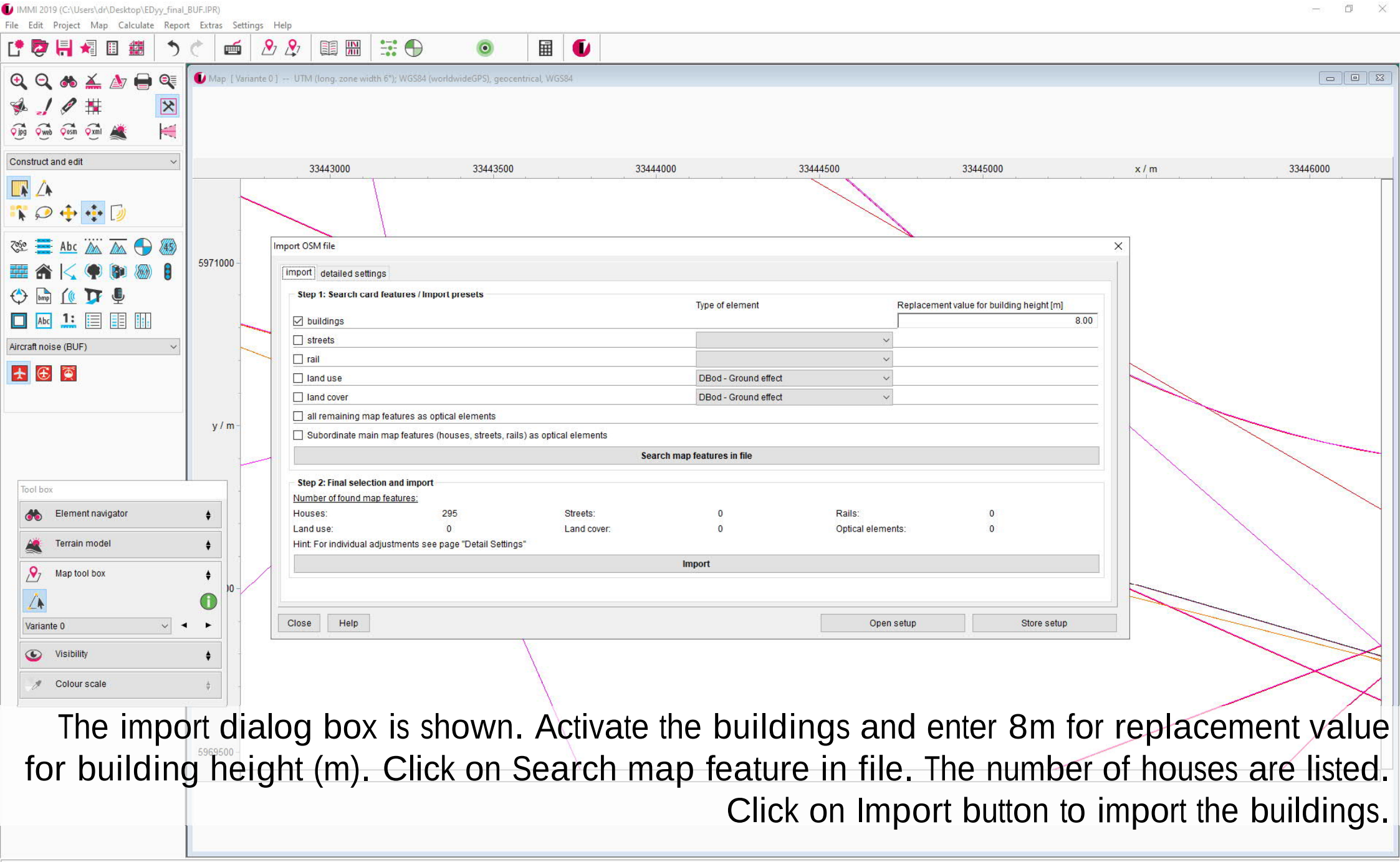
In the map, the corridor width of the flight routes can be displayed be using the corresponding button.



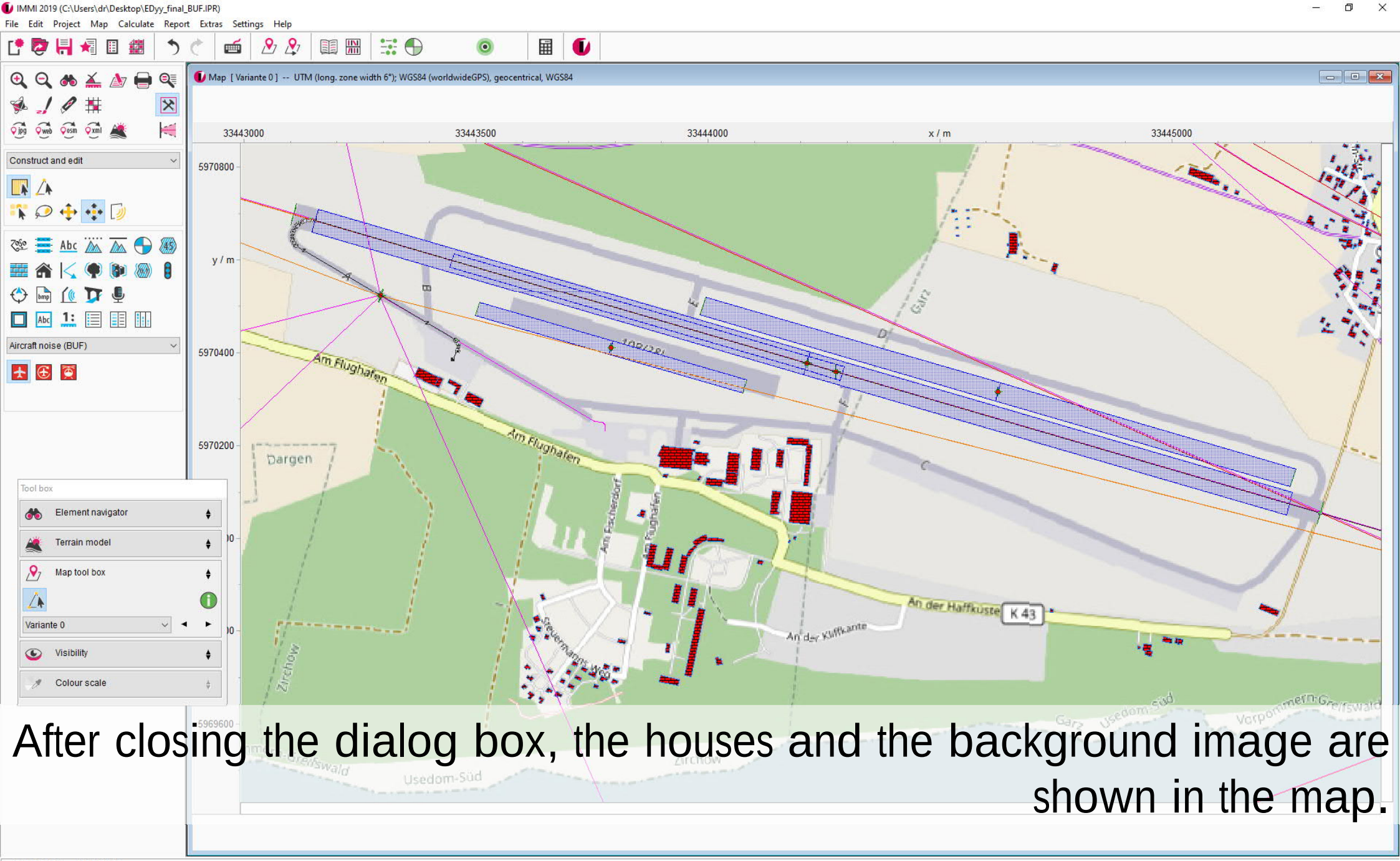
In the next step, a background image and some surrounding houses are imported using the OSM-import function. Zoom into the center of the project.



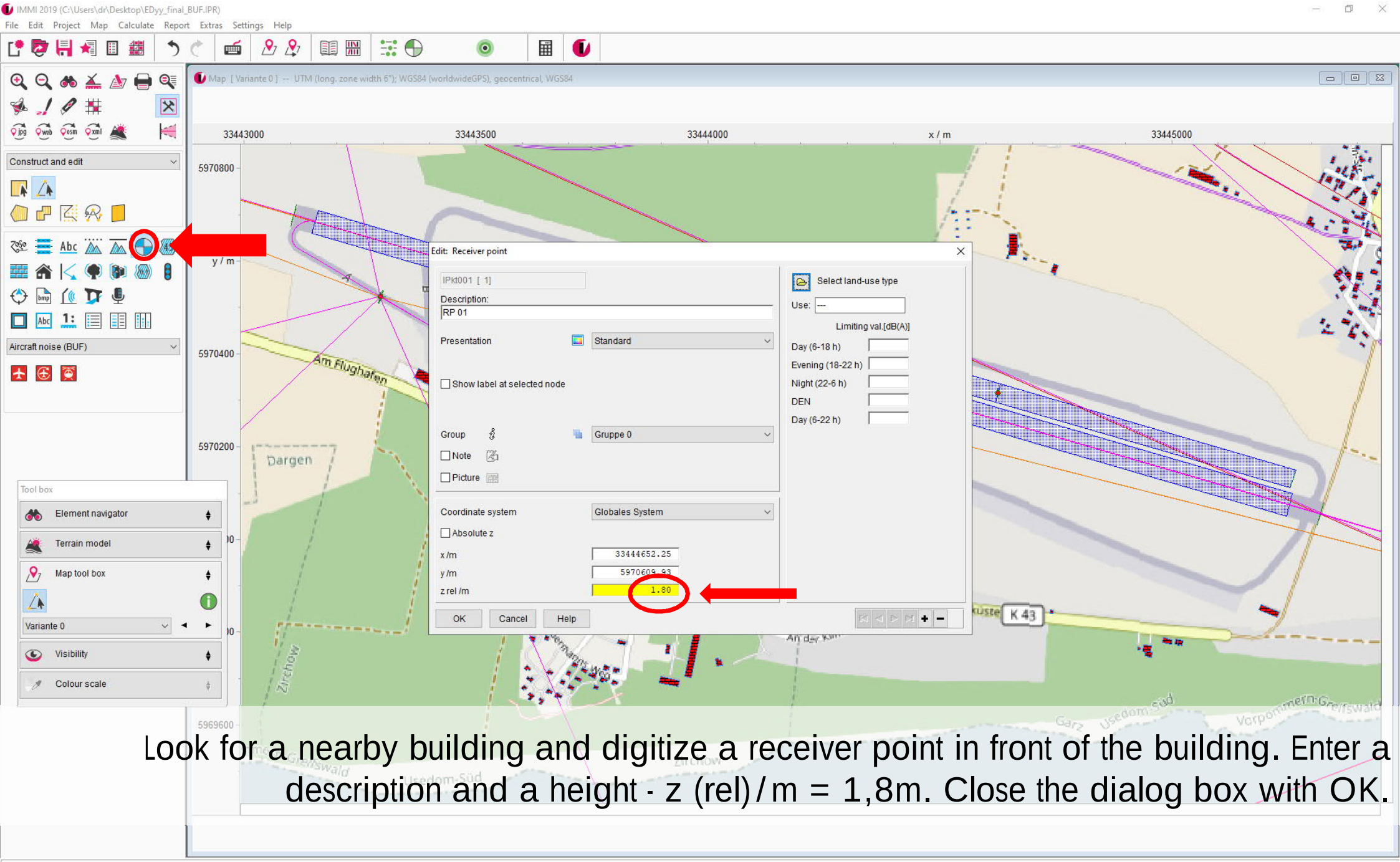
Choose OpenStreetMap as the background image. Use the Select area button to choose a small area around the airport. Click OK to start the import.



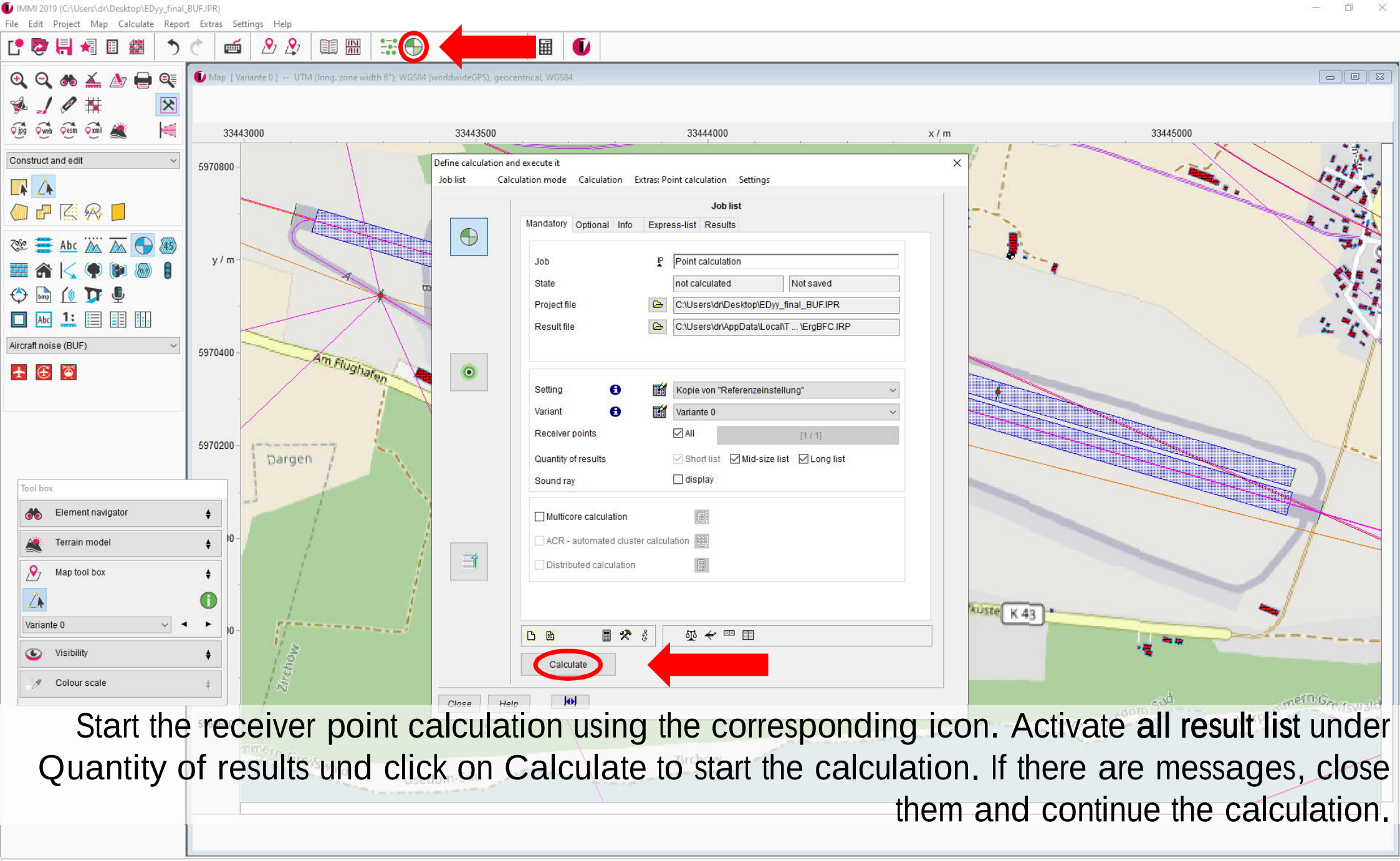
The import dialog box is shown. Activate the buildings and enter 8m for replacement value for building height (m). Click on Search map feature in file. The number of houses are listed. Click on Import button to import the buildings.



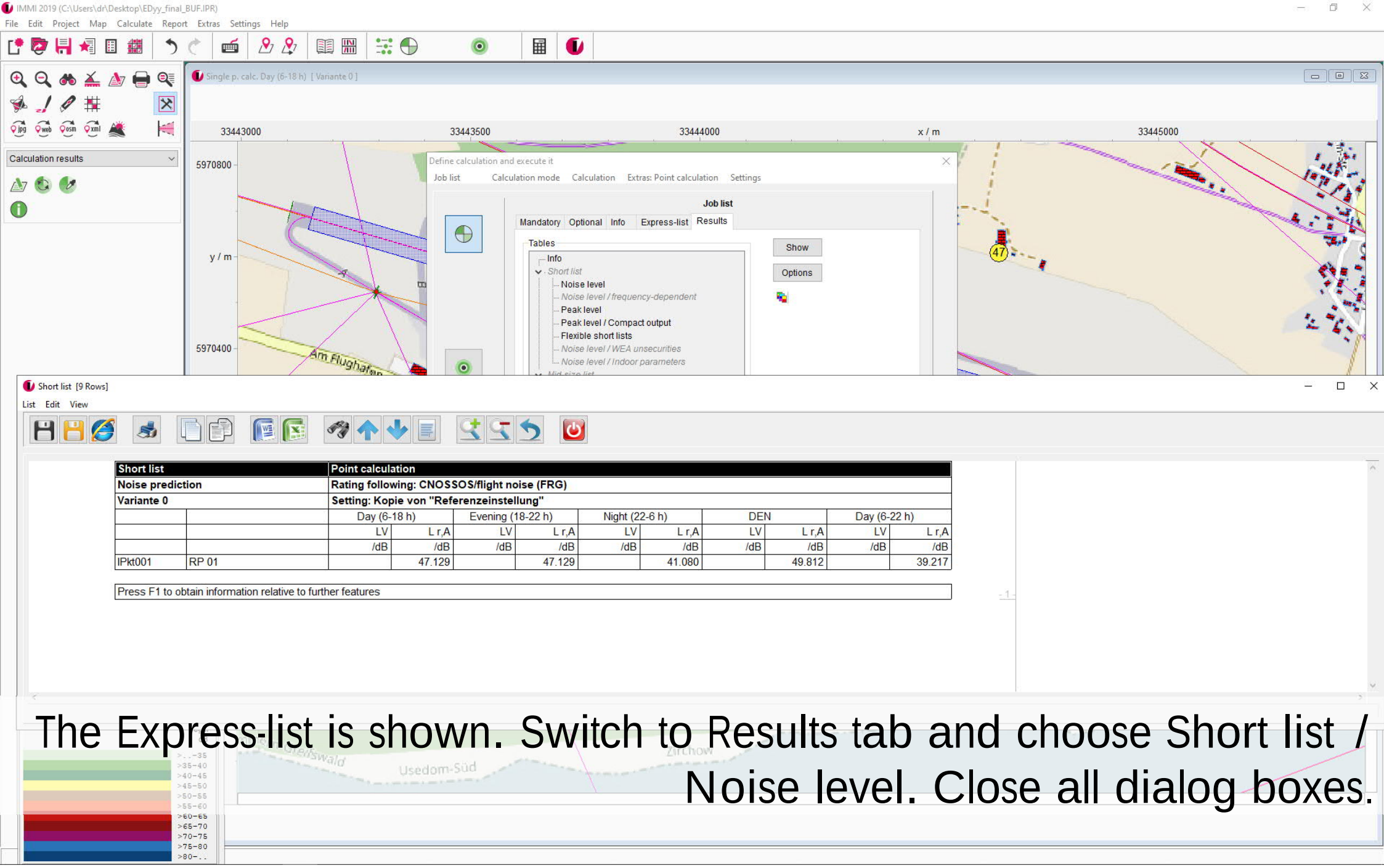
After closing the dialog box, the houses and the background image are shown in the map.



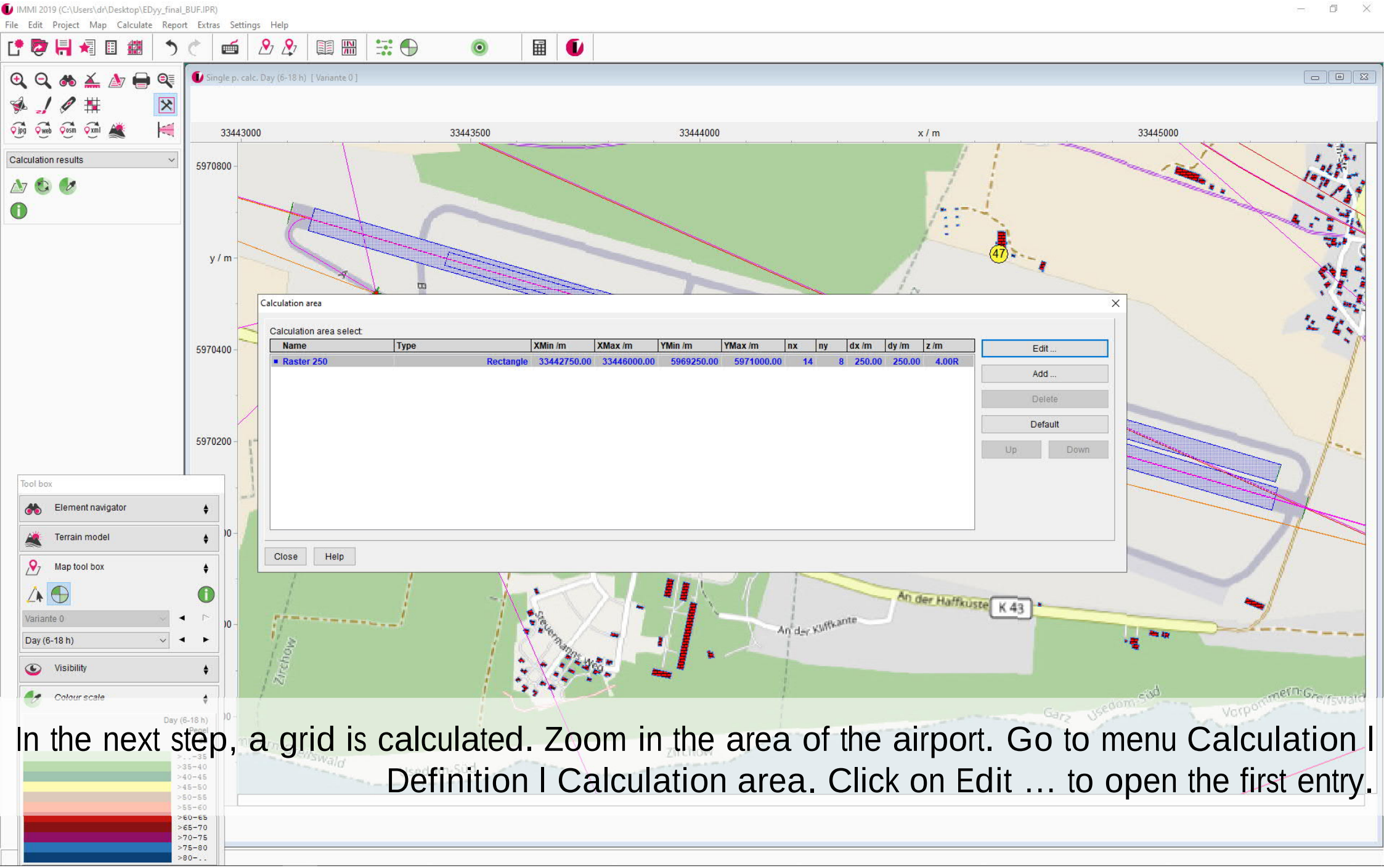
Look for a nearby building and digitize a receiver point in front of the building. Enter a description and a height - z (rel) / m = 1,8m. Close the dialog box with OK.



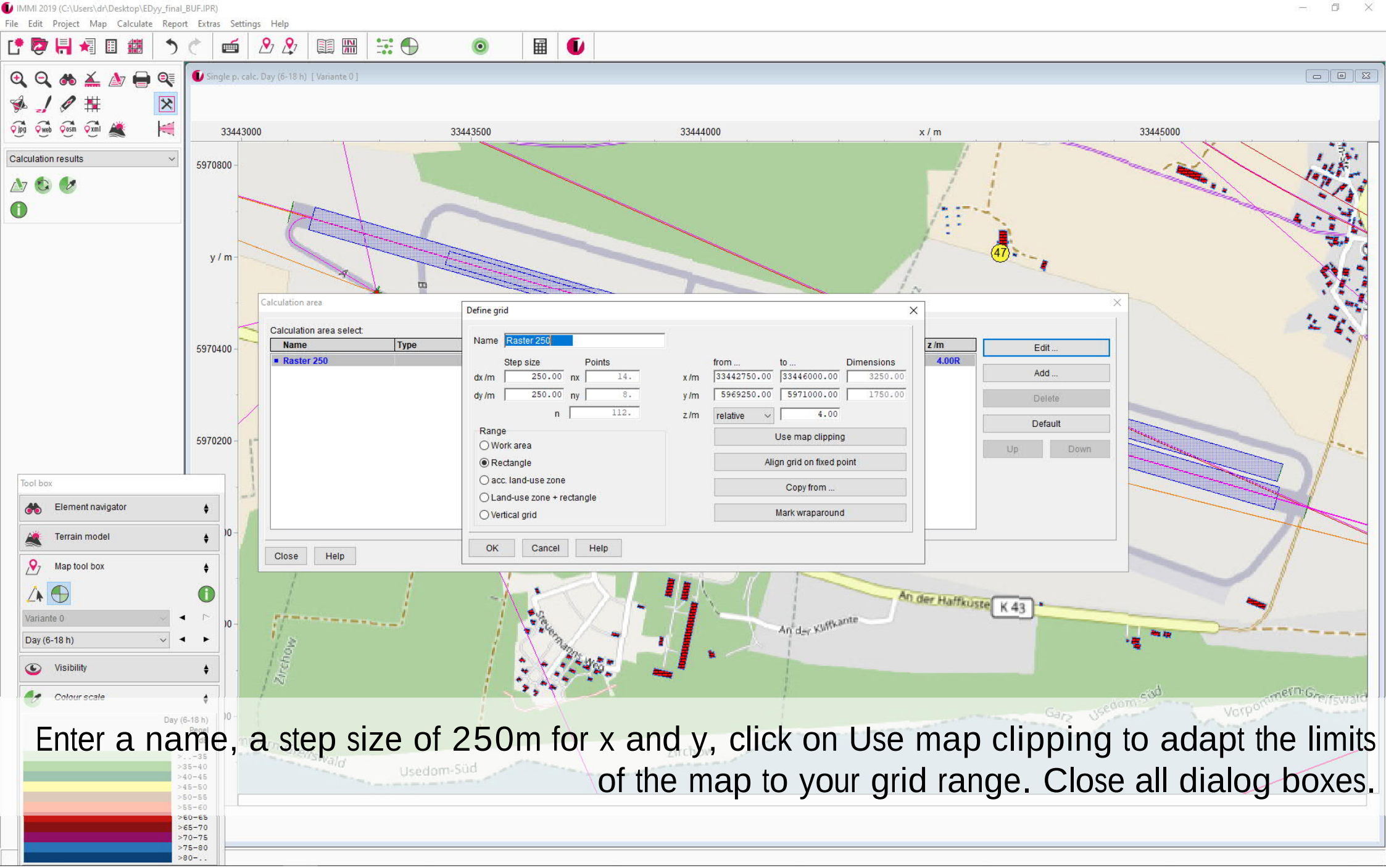
Start the receiver point calculation using the corresponding icon. Activate **all result list** under Quantity of results und click on Calculate to start the calculation. If there are messages, close them and continue the calculation.



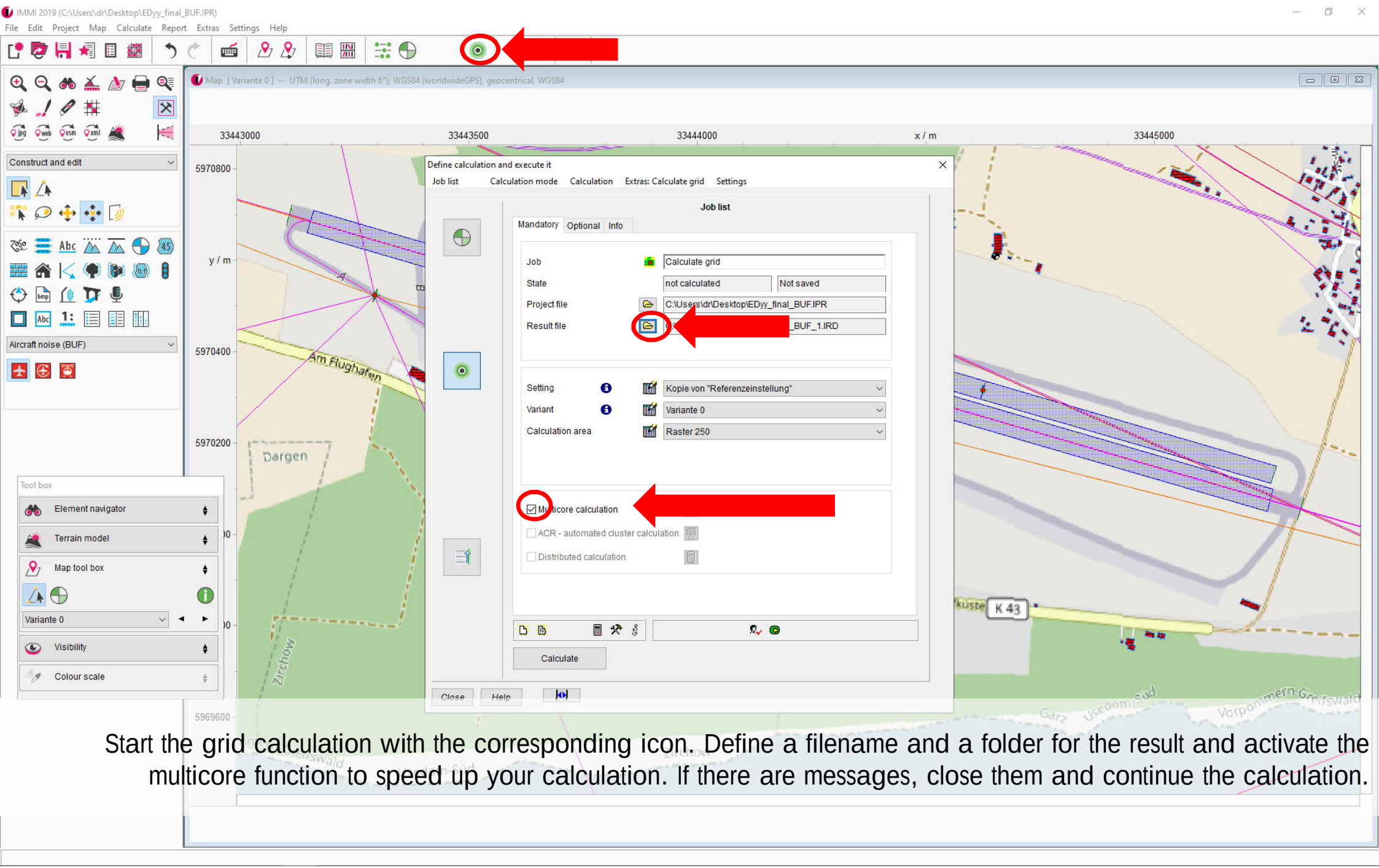
The Express-list is shown. Switch to Results tab and choose Short list / Noise level. Close all dialog boxes.



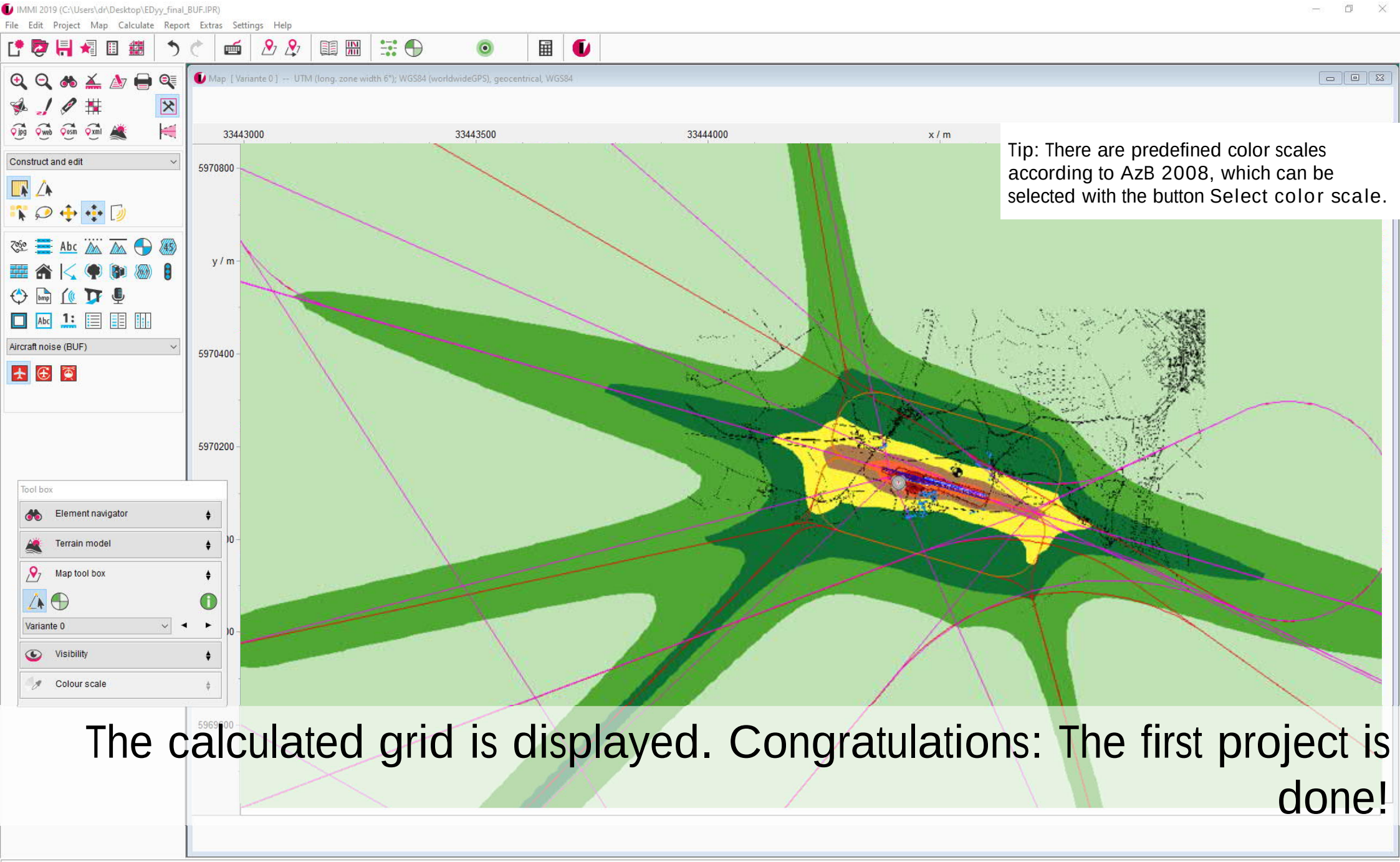
In the next step, a grid is calculated. Zoom in the area of the airport. Go to menu Calculation I Definition I Calculation area. Click on Edit … to open the first entry.



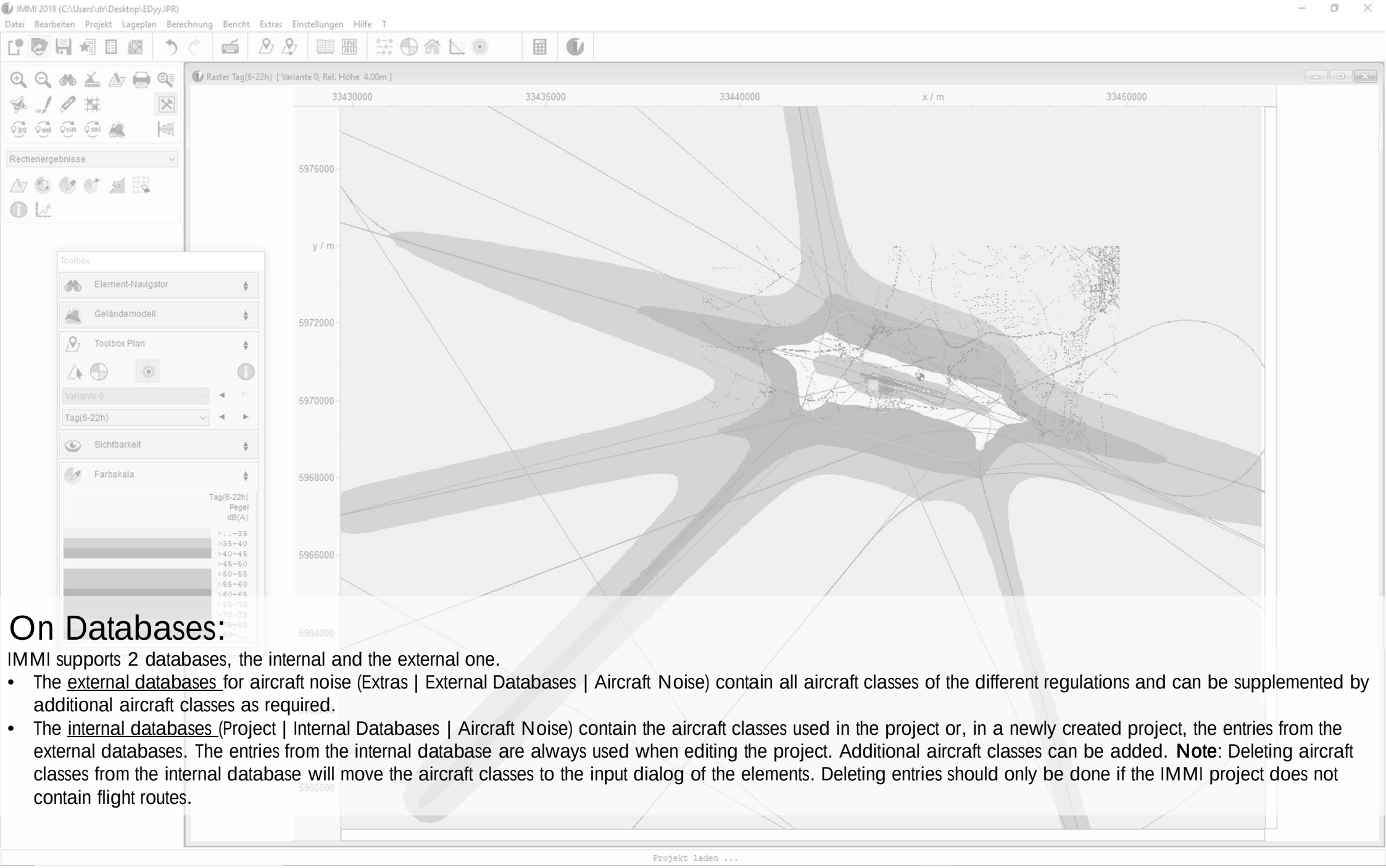
Enter a name, a step size of 250m for x and y, click on Use map clipping to adapt the limits of the map to your grid range. Close all dialog boxes.



Start the grid calculation with the corresponding icon. Define a filename and a folder for the result and activate the multicore function to speed up your calculation. If there are messages, close them and continue the calculation.



The calculated grid is displayed. Congratulations: The first project is done!

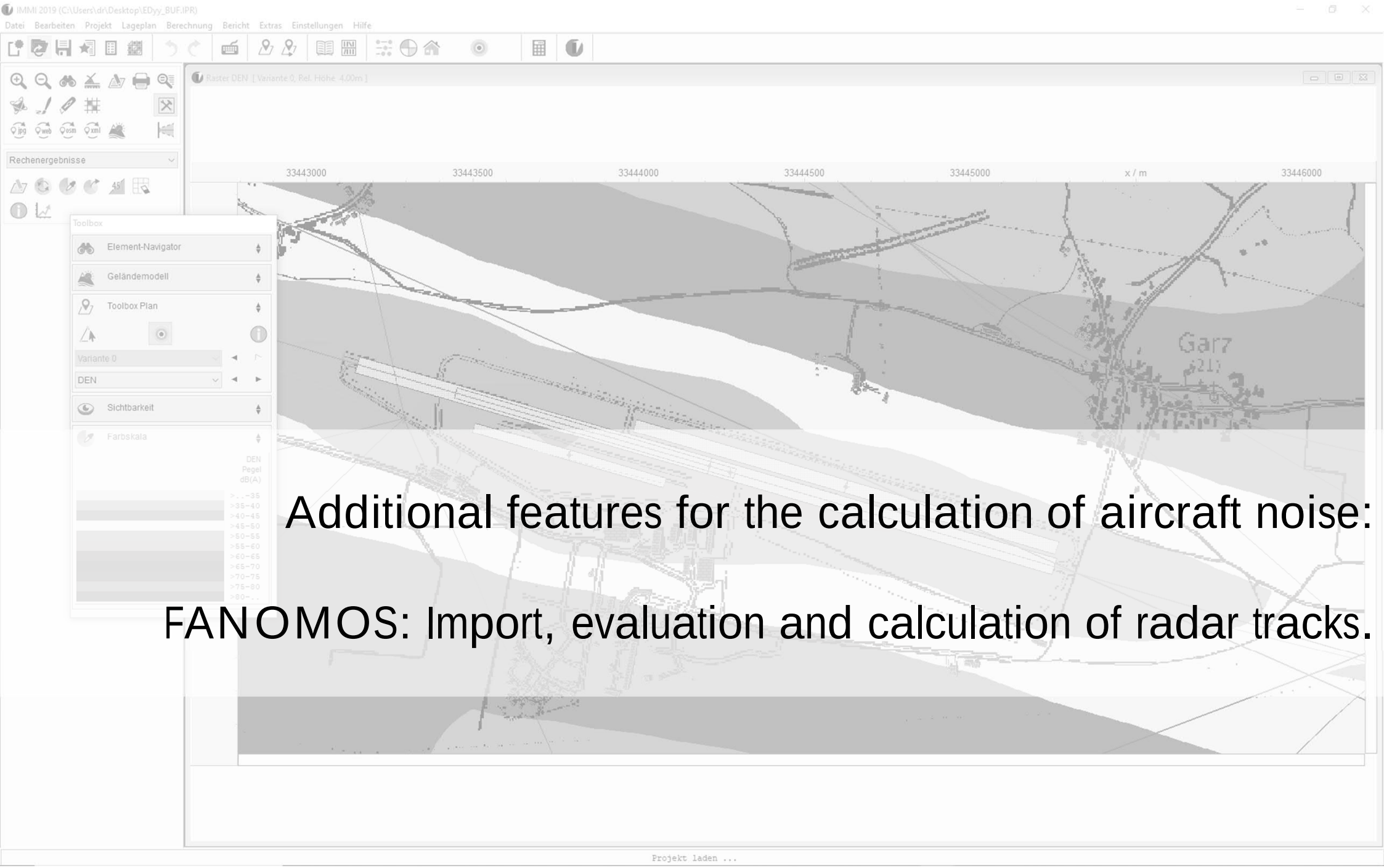


On Databases:

IMMI supports 2 databases, the internal and the external one.

- The external databases for aircraft noise (Extras | External Databases | Aircraft Noise) contain all aircraft classes of the different regulations and can be supplemented by additional aircraft classes as required.
- The internal databases (Project | Internal Databases | Aircraft Noise) contain the aircraft classes used in the project or, in a newly created project, the entries from the external databases. The entries from the internal database are always used when editing the project. Additional aircraft classes can be added. **Note**: Deleting aircraft classes from the internal database will move the aircraft classes to the input dialog of the elements. Deleting entries should only be done if the IMMI project does not contain flight routes.

IMMI is quality assured according to Guideline (EU) 2015/996 and ISO TR 17534-4.


Additional features for the calculation of aircraft noise:
FANOMOS: Import, evaluation and calculation of radar tracks.