1a. Initialize OSM data

This notebook:

- Loads the polygon defining the study area and then creates a grid overlay for the study area.
- Downloads street network data for the study area using OSMnx.
- Creates a network only with bicycle infrastructure (with queries defined in `config.yml`).
- Creates additional attributes in the data to be used in the analysis.

Sections

Load data for study area and create analysis grid

This step:

- Loads settings for the analysis from the configuration file `config.yml`.
- Reads data for the study area.
- Creates a grid overlay of the study area, with grid cell size as defined in `config.yml`.

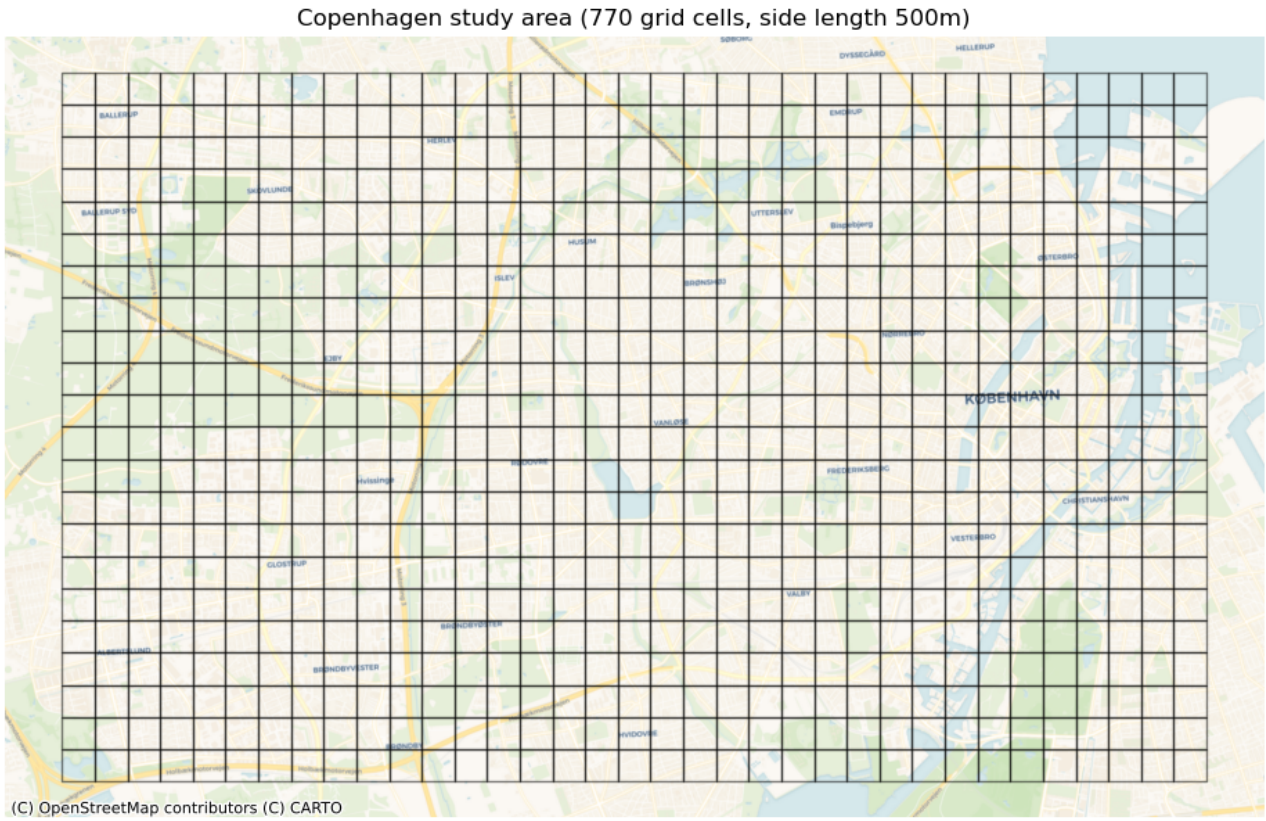
Load data for study area

The study area is defined by the user-provided polygon. It will be used for the computation of *global* results, i.e. for the entire study area.

```
The size of the study area is 181.38 km2.
```

Create analysis grid

```
The grid contains 770 square cells with a side length of 500 m and an area of 0.25 km2.
This grid will be used for local (grid cell level) analysis:
```



Download and preprocess OSM data

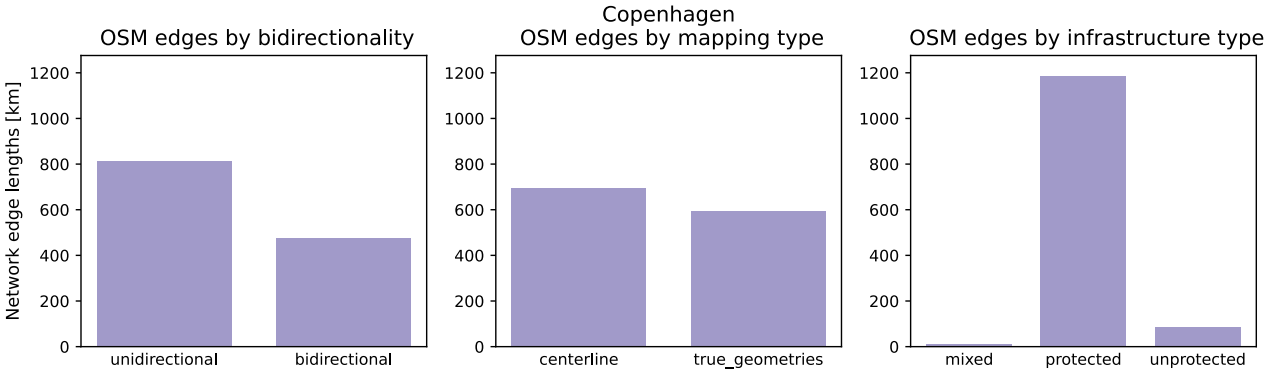
This step:

- Downloads data from OpenStreetMap using OSMnx.
- Projects the data to the chosen CRS.
- Creates a subnetwork consisting only of bicycle infrastructure.
- Classifies all edges in the bicycle network based on whether they are protected or unprotected bicycle infrastructure, how they have been digitized, and whether they allow for bidirectional travel or not
- Simplifies the network *(to read more about the modified OSMnx simplification (Boeing, 2017) used here, we refer to this GitHub repository which contains both the simplification functions, explanation of the logic and a demonstration)*.
- Creates copies of all edge and node data sets indexed by their intersecting grid cell.

```
Edges where 'bicycle_bidirectional' is False: 33534 out of 50959 (65.81%)
Edges where 'bicycle_bidirectional' is True: 17425 out of 50959 (34.19%)


Edges where the geometry type is 'centerline': 25742 out of 50959 (50.52%)
Edges where the geometry type is 'true_geometries': 25217 out of 50959 (49.48%)


Edges where the protection level is 'protected': 46583 out of 50959 (91.41%)
Edges where the protection level is 'unprotected': 3713 out of 50959 (7.29%)
Edges where the protection level is 'mixed': 663 out of 50959 (1.3%)
```




```
The graph covers an area of 179.70 km2.
The length of the OSM network with bicycle infrastructure is 1063.18 km.
```