

Municipal Topographic Network

The Barcelona Municipal Topographic Network (hereafter XTM) is a reference-point topographic network covering the whole of the Barcelona municipality. It is based on the Utilitarian Network provided by the Cartographic Institute of Catalonia (ICC) and serves as the basis for topographical studies carried out within the Barcelona municipality. This network is the property of Barcelona City Council, which is responsible for producing it, moderating it and maintaining it for public use.

Using a drill and epoxy resin, the points are marked in granite kerbstones with geopoint bolts at least 7.50 cm long and washers bearing the name of Barcelona City Council. The network currently consists of some nine hundred points spread across the city.

Each point uses UTM coordinates on the ED50 reference system and in the reference area specific to Barcelona City Council, with height measured according to the mean sea level at Alicante.



The XY coordinates are derived from GPS observables, with the XY positioning tolerance being no greater than 2 cm. The Z coordinate is derived from geometric elevation using ICC elevation bolts, with the positioning tolerance being no greater than 8 mm. Where the planimetric precision required with GPS is not achieved, linear polygons may be accepted that begin and end in bases belonging to a group of four bases observed with GPS and positioned with a relative precision of 2 cm.

Each time the XTM is densified, points that are added are compensated in the network by least squares and integrated into the existing Municipal Topographic Network. Positioning error calculations must be less than two centimetres.

Description of the topographic vertex files

The **topographic vertex** files describe each of the points that make up the XTM network. These files include the following data:

- **Vertex name.**
- **UTM coordinates** for the ED50 ellipsoid reference, in the Barcelona City Council reference area and the ICC reference area. In both cases the height is measured according to the mean sea level at Alicante.
- **Location** This gives the nearest postal address to the vertex and a literal description of the point's position. It also describes the kind of sign used.
- **Geographic coordinates:** latitude, longitude and elevation on ellipsoid WGS 84.
- **Positioning errors** of the point in X, Y and Z, which indicate the degree of usefulness of the point's coordinates in the network as a whole.
- **Other** data of interest to users (linear anamorphosis, meridian convergence and calculation and revision data).
- **Graphic information:** the point's location on the city street map, a photograph of the point and a sketch to locate the point (a description without geographic orientation).

Barcelona Municipal Topographic Network

Vertex Name: 105214

UTM coordinates

Ellipsoid reference: ED50
 Zone: 31
 Reference area: Barcelona City Council

X= 432853.415 m
Y= 4584284.778 m
H= 5.049 m

Location

In front of:
 Avinguda Diagonal nº. 0174

Description:
 Avinguda Diagonal with Rambla de Poblenou.

Type of sign: Geopoint bolt with washer.

UTM coordinates

Ellipsoid reference: ED50
 Zone: 31
 Reference area: Cartographic Institute of Catalonia

X= 432853.467 m
Y= 4584284.98 m
H= 5.049 m

Geographic coordinates

Ellipsoid reference: WGS 84

Longitude = 2° 11' 43.93" North
Latitude = 41° 24' 19.66" East
H = 54.840 m

Positioning errors

Error X: 0.003 m
Error Y: 0.001 m
Error Z: 0.001 m

Other

Linear anamorphosis: 0.99965548
Meridian convergence: -0.53133108 °
Calculation data: 08/02/2005
Revision data: 08/02/2005

