

Specifications: 1:1,000 Metropolitan Topographic Map

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1. INTRODUCTION

The 1:1,000 Metropolitan Topographic Map is a 3D continuous topographic base map at a scale of 1:1,000 of urban and rural areas in the Barcelona metropolitan area, created through photogrammetric restitution and field revision work based on images captured by digital photogrammetric flights with 7.5 cm pixel resolution.

This map is registered in the official section of the Cartographic Register of Catalonia (RCC) and is, therefore, official in nature, in accordance with Decree 398/2006 of 24 October, approving the Regulation implementing Law 16/2005 of 27 December concerning geographic information and the Cartographic Institute of Catalonia with respect to the official nature and use of cartographic services and inter-administrative relations and planning. For this reason, its use is compulsory for public authorities in administrative actions that require cartography, and it ensures that there is no duplication of cartography at this scale in the metropolitan area.

The first photogrammetric flight corresponding to this cartographic series was in 2002. Subsequently and to date, there have been several other flights to keep the topographic base updated and expand its territorial coverage. The date of the last update is different for each sheet.

Currently, the series consists of **1,902 sheets**, and the distribution formats currently available are DGN (3D), DWG (2D), DXF (3D), SHP (3D) and PDF (2D), with the aim of cartography reaching the largest number of users, including those with a less technical background.

All of these map sheets are created in accordance with various technical specification sheets, all of which are official in nature:

2. TECHNICAL SPECIFICATION SHEET for the creation of 3D topographic cartography, 1:1,000 and 1: 2,000 (CT-1M and CT-2M) v2.1 + ADDENDUM for the creation of 3D cartography, 1:1,000, for the AMB

- It was created through photogrammetric restitution and field revision work based on images captured by digital photogrammetric flights with approximately 7.5 cm pixel resolution, with a resulting planimetric accuracy of 20 cm in 90% of elements, well defined and collected through photogrammetry, and a resulting altimetric accuracy of 25 cm in 90% of marked points.
- The altimetric model is 2.5D, that is, the graphic elements (points, lines and polygons) are defined with points with X, Y and Z coordinates, but it is not possible to represent a truly three-dimensional city model.
- It provides information on the source of the data (photogrammetry or field revision).
- The specific addendum for the creation of maps for the AMB is a regulatory supplement, which introduces certain changes to the v2.1 specifications, namely, determining format specifications for DGN v8, which allow a more user-friendly identification of the elements, since the levels have names and not just numbers; removal of linear patterns and their replacement with line styles; the introduction of new elements, such as “interior front of blocks”, etc.
- The files that correspond to sheets created in accordance with these rules and standards have the suffix “**amb21**” in their name.

Download the rules and standards:

- Technical Specification Sheet for cartography 1:1,000 v2.1:
https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/V2.1/E1m2mv21epe_2.pdf
- Dictionary for cartography 1:1,000 v2.1:
https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/V2.1/E1m2mv21dpe_1.pdf
- Addendum for the creation of 3D cartography, 1:1,000, for the AMB:
[https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/V2.1/addenda_conveni_2007-2010\(v2.1\)-rev.2017.pdf](https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/V2.1/addenda_conveni_2007-2010(v2.1)-rev.2017.pdf)

3. TECHNICAL SPECIFICATION SHEET for the creation of 3D topographic cartography at scales of 1:1,000 and 1:2,000 (CT-1M and CT-2M) v2.2. + ADDENDUM for the creation of 3D topographic cartography at a scale of 1:1,000 (CT-1M) v2.2 for the AMB + ADDENDUM for the creation of 3D topographic cartography at a scale of 1:1,000 (CT-1M) v2.2 for Barcelona City Council

The v2.2 specification sheet was approved by the Catalonian Cartographic Coordination Commission (C4) in 2009. It follows on from the above technical specification sheet (v2.1) and improves it in several aspects:

- It improves the data model with the inclusion of new elements (break lines, shape lines, building polygons, etc.), enabling the creation of three digital models with different elevations: DTM (Digital Terrain Model), DSM (Digital Surface Model for the creation of orthophotos) and DSM True Ortho (Digital Surface Model for the creation of true orthophotos). This data model allows the creation of 3D city models with an LOD1 level of detail (flat roofs).
- It classifies elements according to whether or not they should be considered a slope break line. It also allows classification of elevated sections of certain elements (roads, railways, etc.).
- It introduces shape lines that altimetrically complement other elements, so the relief is more carefully moulded.
- The specific addendum for the creation of maps for the AMB is a regulatory supplement, which introduces certain changes to the v2.2 specifications: it adds some elements to the catalogue (painted lines, car park markings, pedestrian crossings, etc.).
- The addendum for the creation of maps for Barcelona City Council is a regulatory supplement that introduces some changes to the v2.2 specifications. Broadly speaking, it adds some elements to the catalogue (escalators, street lifts, solar panels, etc.), amends some elements in the catalogue and includes tacheometric surveys as a potential new source of data for some of the elements.
- The names of the files corresponding to the sheets created in accordance with these rules and standards have the suffix “**icc22**”, when created as per the v2.2 data model + AMB addendum or have the suffix “**bcn22**”, when created as per the v2.2 data model + Barcelona City Council addendum.

Download the rules and standards:

- TECHNICAL SPECIFICATION SHEET for the creation of 3D topographic cartography at scales of 1:1,000 and 1:2,000 (CT-1M and CT-2M) v2.2:
<https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/V2.2/ct1m2mv22epe.pdf>
- Dictionary for the creation of 3D topographic cartography at scales of 1:1,000 and 1:2,000 (CT-1M and CT-2M) v2.2:
<https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/V2.2/ct1m2mv22dpe.pdf>
- Addendum for the creation of 3D topographic cartography at a scale of 1:1,000 (CT-1M) v2.2 for the AMB:
https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/V2.2/Addenda_AMB_v2.2_2014.pdf
- Addendum for the creation of 3D topographic cartography at a scale of 1:1,000 (CT-1M) v2.2 for Barcelona City Council:
https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/V2.2/2012_03_14_-_Addenda_al_plec_2_2_BCN.pdf

4. TECHNICAL SPECIFICATIONS of the simplified model of 3D topographic cartography at 1:1,000 (CT-1M) v2.2 for the AMB

This data model has the aim of facilitating the use of topographic cartography at a scale of 1:1,000, created in accordance with v2.2 of the technical specifications approved by the C4. Its main feature is a significant reduction in the number of levels or layers and a change in their names, so that identification of the elements is much more intuitive.

It is distributed in DGN (3D) and DWG (2D) formats, and the names of the files corresponding to the sheets created in accordance with these rules and standards have the suffix “**amb22**”.

Download the rules and standards:

- SPECIFICATIONS OF THE SIMPLIFIED MODEL V2.2 AMB:
https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/V2.2/AMB_1000_V22_simplificat.pdf

5. TECHNICAL SPECIFICATION SHEET FOR 3D DIGITAL TOPOGRAPHIC CARTOGRAPHY AT SCALES OF 1:500 AND 1:1,000 FOR THE MUNICIPALITY OF SANT CUGAT DEL VALLÈS

This is a specification sheet for the creation of large-scale topographic maps for Sant Cugat del Vallès Council. The cartography created with these specifications is also registered in the RCC and is, therefore, official in nature within the municipality of Sant Cugat, although the data model used is not one of the standard models, such as v2.1 or v2.2.

The data model is very similar to CT-1M and CT-2M v2.1, but the catalogue of elements is much more extensive and incorporates many elements of street furniture, service networks, mobility, etc. It is created with topographic surveys, photogrammetric restitution and field revision.

The files that correspond to sheets created in accordance with these rules and standards have the suffix “**stc21**” in their name.

Download the rules and standards:

- CARTOGRAPHY SPECIFICATIONS FOR SANT CUGAT COUNCIL:
https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/STC/STC_500-1000_Especificacions.pdf

6. METADATA

With each sheet of cartography, an XML file is delivered with the metadata of the sheet. This file contains additional information of the sheet: responsible entity, data quality, steps of the manufacturing process, data sources, data models, references to technical documentation, temporal and geographical extent, flight and field revision dates, information about the distribution and terms of use, etc.

The metadata have been made in accordance with the IDEC profile, compatible with standard ISO19115 standards, in order to comply with the deployment of the INSPIRE Directive.

In order to display the metadata in a convenient way, you must have the ISO19139.xsl template, as well as some files that enable viewing labels in Catalan, Spanish or English languages. All these files must be in the same folder as the XML metadata file, and can be downloaded at the following link:

<https://geoportalcartografia.amb.cat/AppGeoportalCartografia2/DadesAplicacio/Especificacions/Metadades/ISO19139.zip>

7. FILE NOMENCLATURE

The files containing cartography have a standardised name with the following structure:

bbb_cc_ff_aaaa-ssss-rrrr

Where:

bbb_cc_ff is the sheet identifier of the layout corresponding to the scale (7 or 8 characters in total). In this identifier, *bbb* is the three-digit sequential number of the MTN 1:50,000 sheet (followed, if applicable, by the letter by the additional sheets), while *cc* and *ff* are, respectively, the column and row numbers (each with two digits with zero on the left, if applicable), which occupy the sheet of this scale in the subdivision of the MTN 1:50,000 sheet (subdivision 20 x 20 for the scale 1:2,000 and 40 x 40 for the scale 1:1,000).

aaaa is the year of the flight.

ssss is the geodetic reference system: *ed50* (for the ED50 system) or *et89* for the ETRS89 system.

rrrr represents the data model, which can be:

- *amb21*: cartography created in accordance with specification sheet v2.1 + addendum AMB.
- *icc22*: cartography created in accordance with specification sheet v2.2 + addendum AMB.
- *bcn22*: cartography created in accordance with specification sheet v2.2 + addendum Barcelona City Council.
- *amb22*: cartography created in accordance with specification sheet v2.2 + addendum AMB, but presented in a simplified format.
 - *stc21*: cartography created in accordance with the specification sheet of Sant Cugat del Vallès.