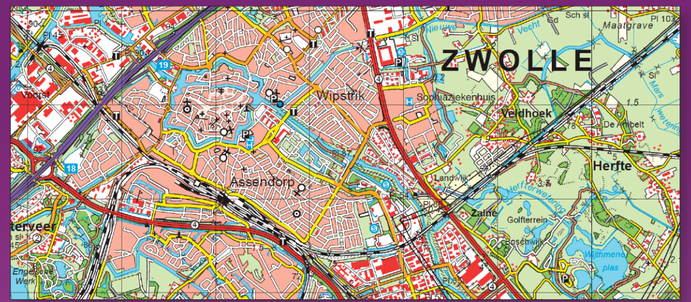
National Mapping in the 21st Century

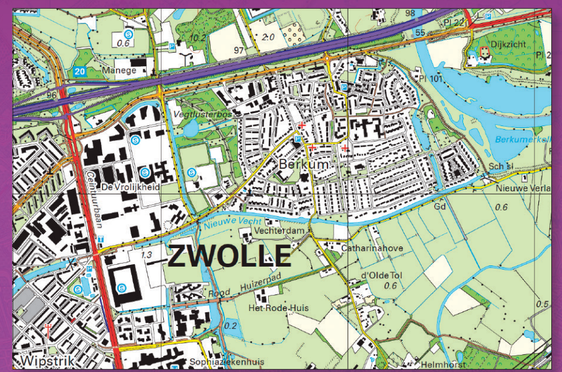
Dutch Kadaster—Automating Production

The Dutch national mapping agency uses ArcGIS® for automated generalization and production of topographic data and maps. The organization configured out-of-the-box software to automate the generalization of the 1:50,000-scale maps from the TOP10NL dataset (1:10,000-scale topographic data). The new automatic generalization process replaces the earlier process used to create the old-fashioned 1:50,000 map. The results of this fully automated system save millions of euros and dramatically reduce production time from years to weeks.



100 Percent Automated Map Production

Kadaster started by translating the cartographer's designs for how the 1:50,000-scale map should look and function into a form of artificial intelligence to encapsulate how different features on the map needed to relate. The source data from TOP10NL was enhanced and enriched with this information. The resultant intelligent map data became the basis for automated symbolization and generalization workflows. Hundreds of individual models were leveraged, and over 70 ArcGIS geoprocessing tools were used to accomplish the processing tasks.



1:25,000 Scale

1:50,000 Scale

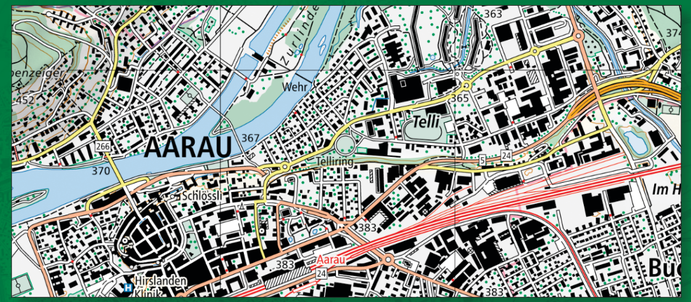
Automating Generalization

These examples illustrate the results of Dutch Kadaster's automated generalization process. Kadaster used a two-stage approach to automating generalization. The major roads network was first used as a basis to partition the country. This produced about 500 partitions that can be separately generalized in the second stage of the approach. Some datasets, such as administrative boundaries, railroads, and high-tension lines, could not be changed or divided and were processed as a whole, nationwide. The data within the partitions and the nationwide data were both processed using the same three-stage model. The first stage was model generalization, which translates the types of information from the TOP10NL data to what would be represented on the map. Next was geometric changes and displacement that aligned, regularized, or simplified geometry. Last was graphical displacement to resolve visual conflicts between symbolized representations of features.

The Netherlands' Cadastre
Land Registry and Mapping Agency
www.kadaster.nl

swisstopo—Achieving Quality Cartography

The Swiss Federal Office of Topography (swisstopo) is responsible for creating and updating the country's topographic data and national map series. ArcGIS is the central production platform for the Topographic Landscape Model (TLM) and map production workflows. The TLM integrates photogrammetry and 3D GIS into the mapmaking process. This system is database driven so that when changes in the real world happen, swisstopo can easily maintain the currency and world-renowned quality of its cartographic end products. Each of these examples includes features from the rich, informative map design of swisstopo's 1:25,000-scale national maps.

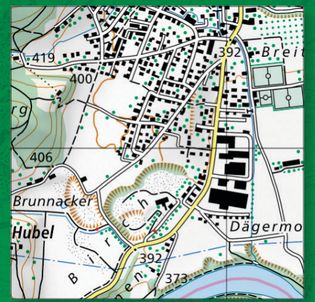


Production PDF

swisstopo used ArcGIS to produce seven 2,520 dpi PDF files and six raster exports for the final prepress process. These files represent individual themes within the maps, such as vegetation or drainage. They were combined to create a single print-ready file for an offset printing press using eight colors, three process colors (black, magenta, and yellow), and five Pantone® spot colors. These PDF files took full advantage of capabilities added to the Production Mapping desktop extension at version 10.1, including color mapping, tint percentage, and overprint properties.

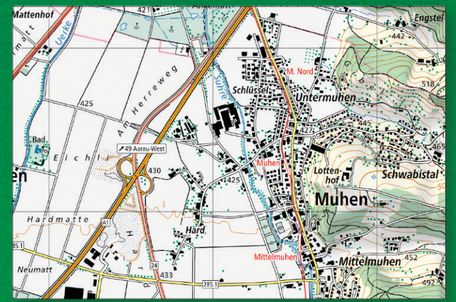
Symbol-Level Drawing and Layer Masking

This map used over 20 masking layers for annotation like "Hunzenschwil" or "Dorfbach," roads and railroad over/underpasses, and connections between various types of roads. Symbol-level drawing enabled each pairing of masks and features to be masked to be managed during production. Group layers managed those layers requiring symbol-level drawing, allowing the cartographers to define the drawing order for related groups of symbols.



CartoProcesses: Embankments

Esri Switzerland aided the effort by developing a collection of "CartoProcesses," one of which was used to create the "hachures" for embankment symbols. Two polyline features that defined the top and bottom of the embankment were the basis for this CartoProcess. The result was editable hachure features that could be rotated, lengthened, or shortened when needed to enhance their relationship with the underlying terrain. This allowed automated production of all embankment features without risk of errors or omissions.



Cartographic Representations with Overrides and Masking

Without cartographic representations, this map, in this form, would simply not be possible. Cartographic representations were used throughout the data model for features like embankments, orchards, and sports fields and even for the relatively simple mask symbols; this was due to an early decision to use a single, consistent symbol for each kind of feature.

All cartographic representations' many possibilities were fully exploited. Multisymbol layers are used, as are various geometric and global effects. Geometry overrides are also widely applied to set not only the size and rotation angles of point symbols but also to set the width, extremity, and caps for polyline symbols along with the grid angle on certain polygon symbols that are filled with markers.

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