Fieldwork Surveying FS01

11. Lecture

State map series in the Czech Republic and thematic maps for construction industry

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Map = a shrunk image of the Earth's surface. The cartographic projection of points on the Earth's surface to the plane of maps is given by mathematical formulas.

Plan = a shrunk and generalized image of a small part of the Earth's surface. The curvature of the Earth is neglected for the projection to the horizontal plane. A plan can be used for radius of an area shorter than 15 km (see lecture 1).

Cartographic generalization = simplification and emphasis of map contents which depends on the scale and the function of the map. The map contents shouldn't be overloaded.

Maps according to the map scale:

1. large-scale maps: larger than 1 : 5 000,
2. medium-scale maps: 1 : 5 000 – 1 : 200 000,
3. small-scale maps: 1 : 200 000 and smaller.

Maps according to the form:

1. **analogue map** – drawing on map sheets.
2. **digital map** – database in a computer, it usually makes possible to carry out various operations with data files.

The map must be actual!

Map contents:

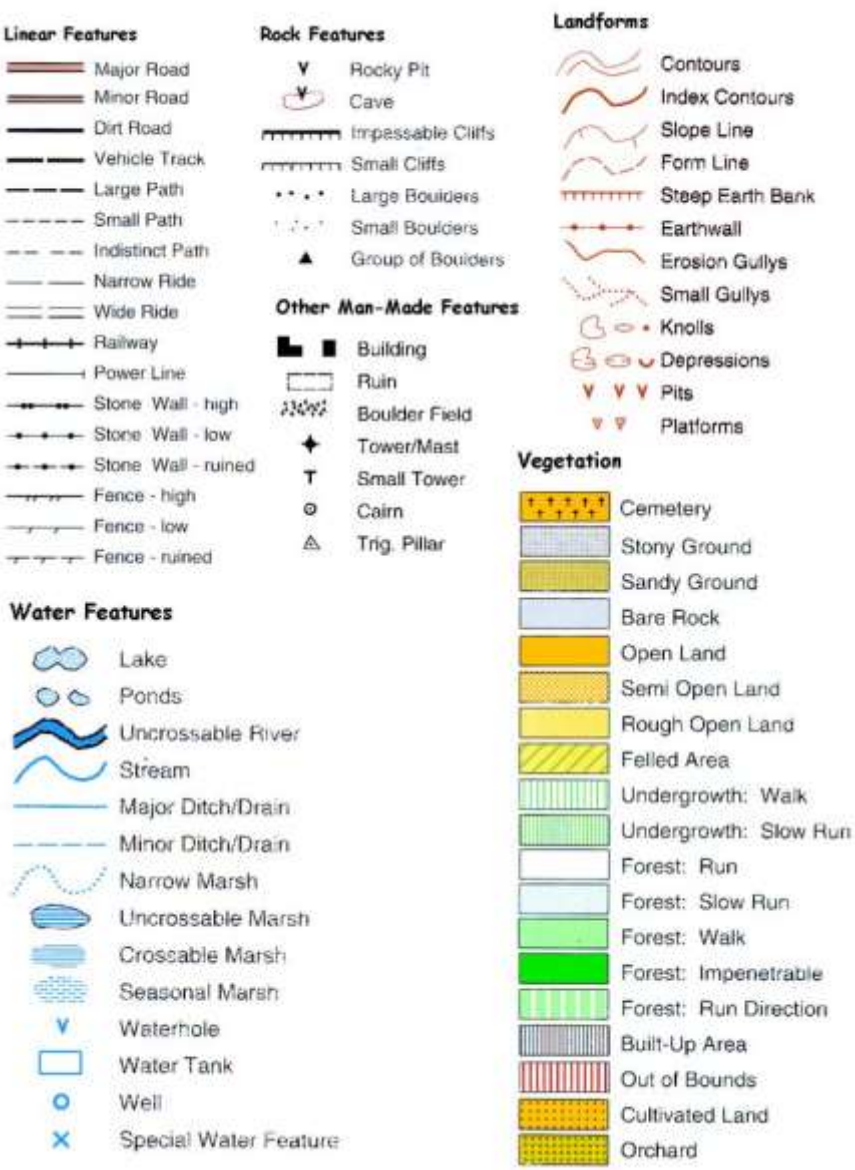
- **planimetric component** – position of an object is marked by an outline or by a map symbol (if the actual size of the object is not possible to draw in particular scale). Map symbols are scheduled in a list of symbols.
- **altimetry**,
- **map lettering**,
- **framework**.

Planimetry

Planimetry indicates the location of the object by its ground plan or by a map symbol in a horizontal sense. For large-scale maps, the positioning is expressed by a ground plan with all the details that can be shown. For smaller scale maps, the plan view is modified, simplified and shifted, or replaced by a map symbols, see generalization.

The map symbols show (do not project) the position on the map, they should be simple, easy to draw and easily distinguishable. The symbols may be point, line, area. The symbols are specified in the map legend.

Map symbols - example



Altimetry

Absolute heights and shapes of topographic surfaces are expressed by means of **contour lines** (the line connecting points with the same absolute height).

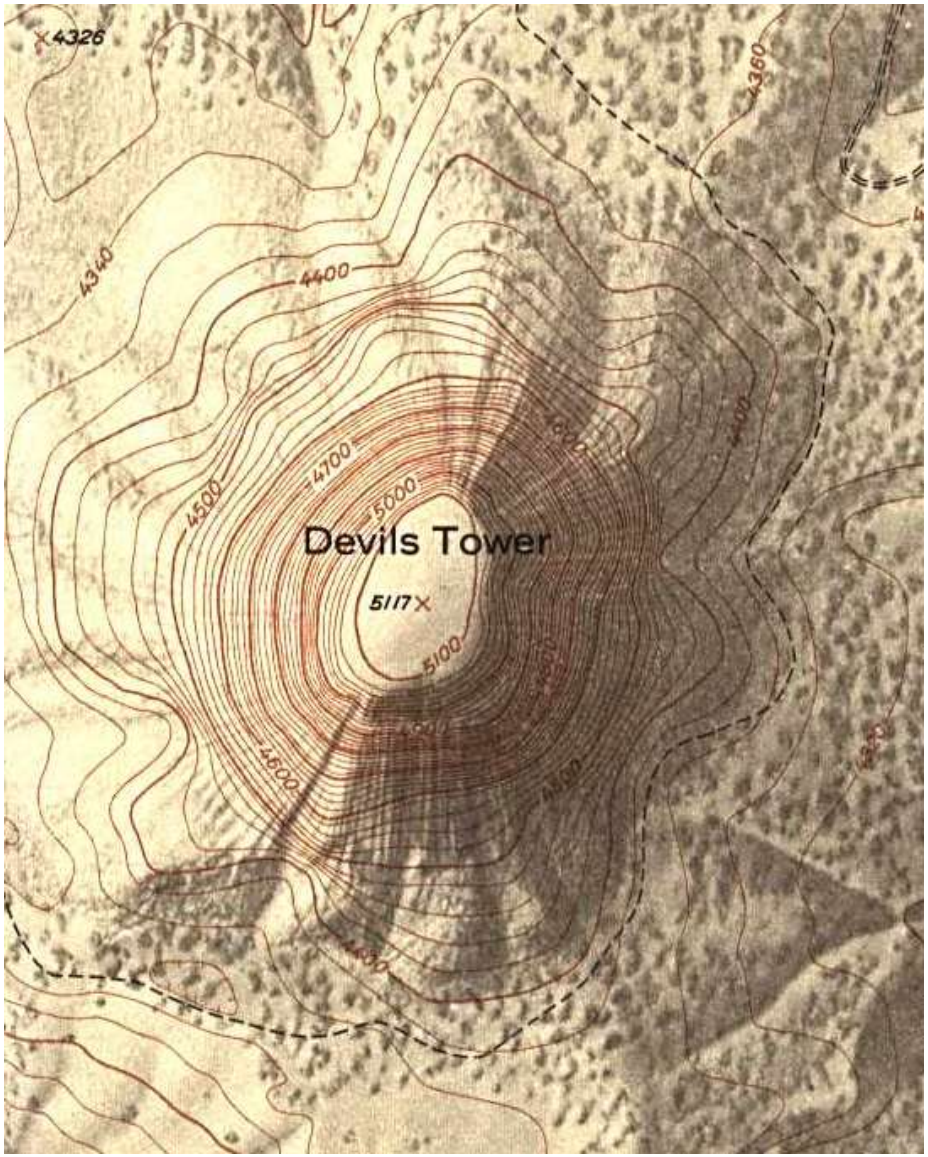
Contour lines:

1. Principal contour (the contour interval depends on the map scale),
2. Index (thickened) contour (for better plasticity of perception),
3. Supplementary contour (dash line).

The altimetry can be expressed also by peak elevations or hachures. Colors or a shading hill are used for geographical maps.

Altimetry - hachures

Altimetry – contour line, peak elevation, shading

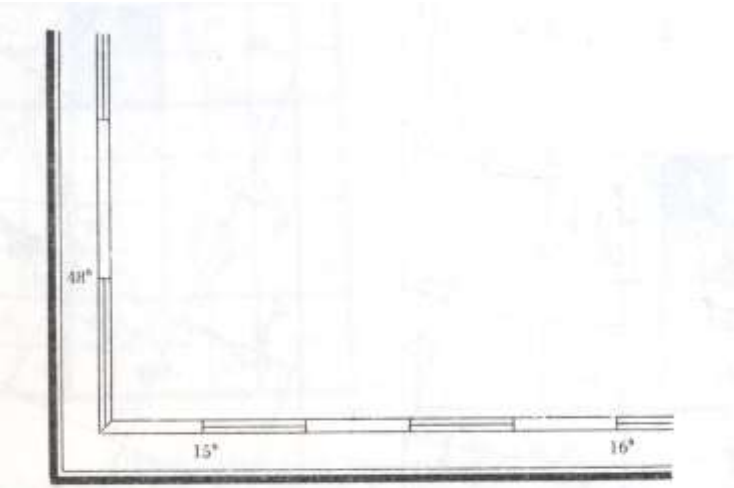


Map lettering

- names on a map, texts in the list of symbols, mark of the map sheet, scale, legend etc.

Framework

- encloses the map drawing. The framework is often completed by a coordinate grid.



Obr. 6. Mapový rám

State map series in the Czech Republic

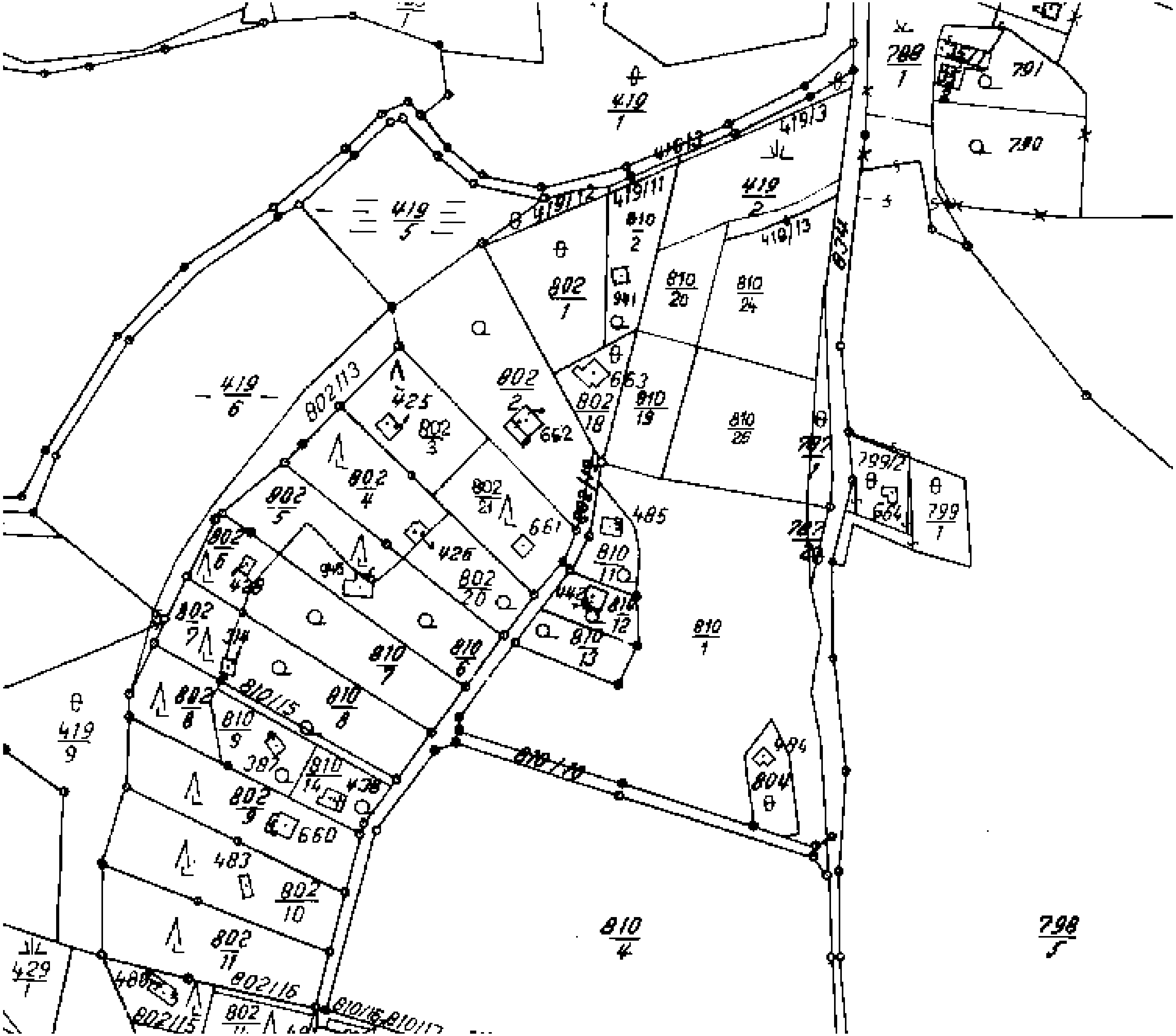
- mapping and updating of state map series are managed by the state through COSMC (Czech Office for Surveying, Mapping and Cadastre – Český úřad zeměměřický a katastrální - ČÚZK)
- www.cuzk.cz – map products and places where is possible to buy them
- maps are usually available both in analogue and in digital forms

Large-scale maps

1. cadastral maps 1 : 2 880
2. cadastral maps of decimal scales
3. derived 1 : 5 000 state map
4. state map 1 : 5 000

1. Cadastral maps 1 : 2 880

- these maps originated from maps of the „stable“ cadastre of the 19th century in Austrian Empire in Cassini-Soldner’s projection which were drawn from the 19th century to the twenties of the 20th century
- 60% of contemporary cadastre of real estates maps
- only the planimetry is displayed – administrative and property boundaries,
- maps are used for a registration of proprietary relations
- copies of maps are available in cadastral offices



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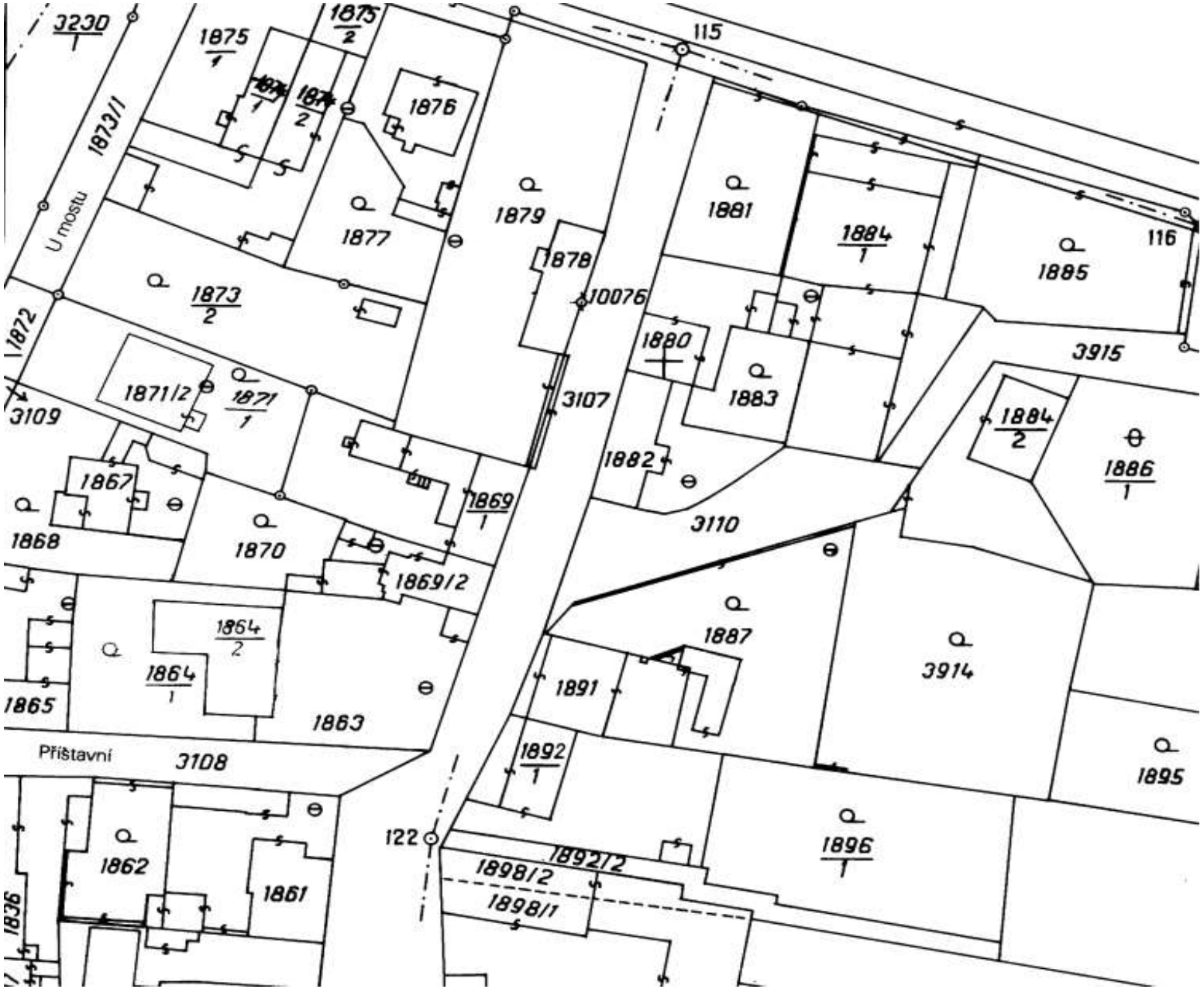
2. Cadastral maps of decimal scales

- 1:1 000, 1:2 000 a 1:5 000
- datum of Unified trigonometric cadastral net S-JTSK
- maps were drawn from the thirties to the nineties of the 20th century
- maps cover about 40% of the Czech Republic
- planimetric maps – registration of proprietary relations (taxes)
- copies of maps are available in cadastral offices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1871/1
3109
3107
1883
1884/2
1886/1
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1869/1
3110
1869/2
1864/2
1887
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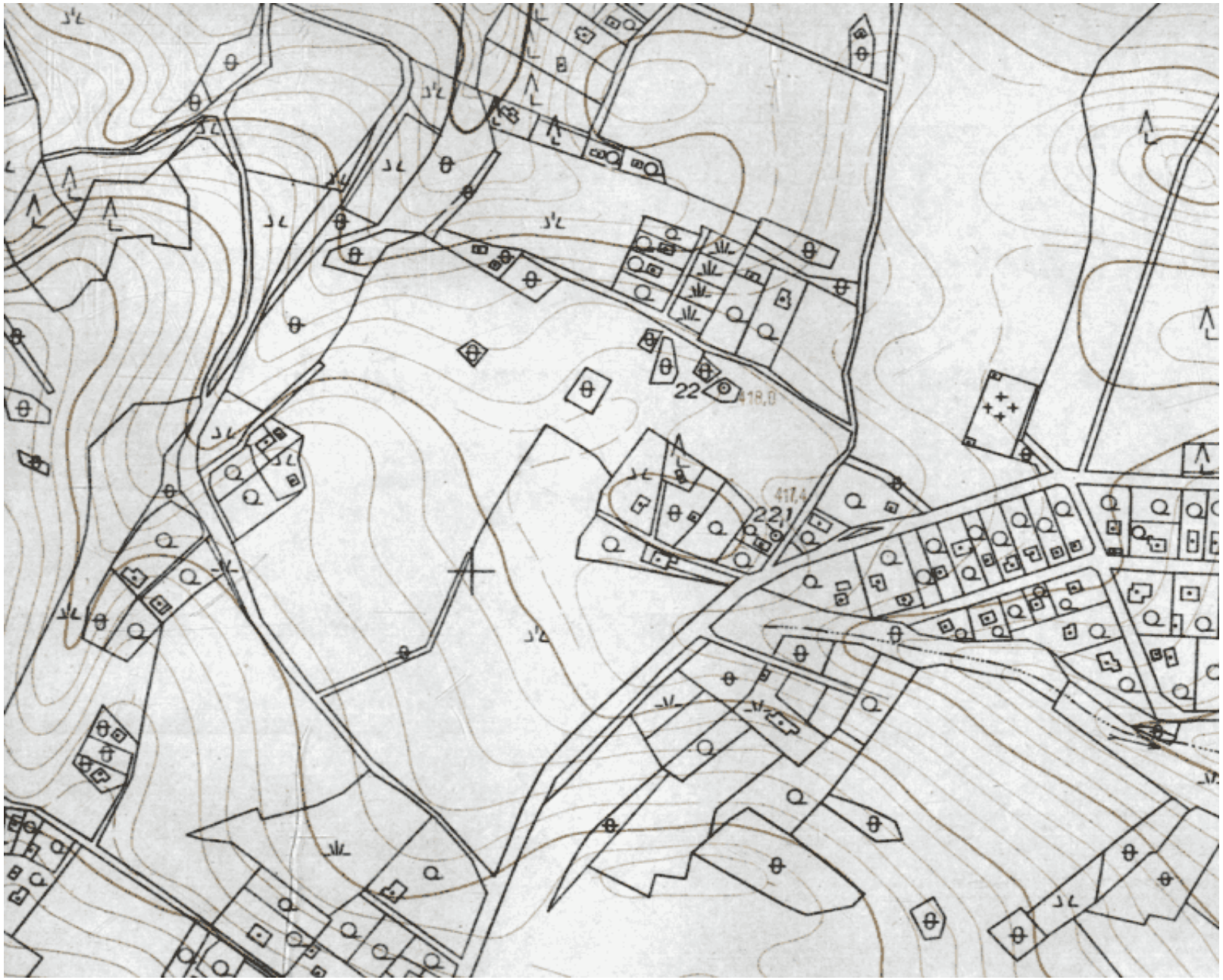
3914
1865
1891
1863
1892/1
Přístavní
3108
1895
122
1896/1
1892/2
1898/2
1898/1
1862
1861
1836

3. Derived 1 : 5 000 state map

- planimetric component of the map is in black colour and originated from the cadastral maps and aerial survey photographs
- altimetry is in brown colour and originated from the basic map 1:10 000
- maps are used for town and country planning
- maps are available in cadastral offices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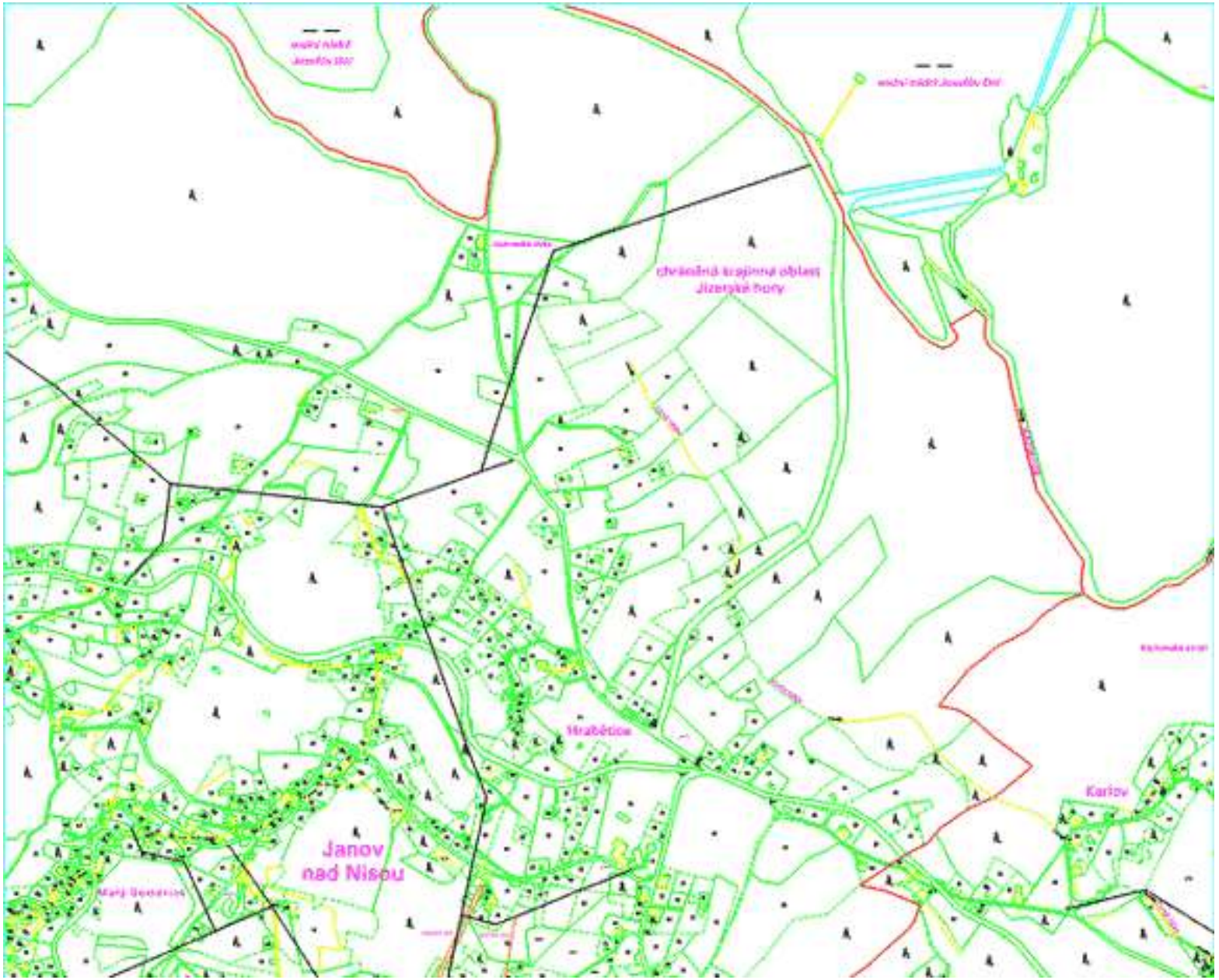
417.4
221

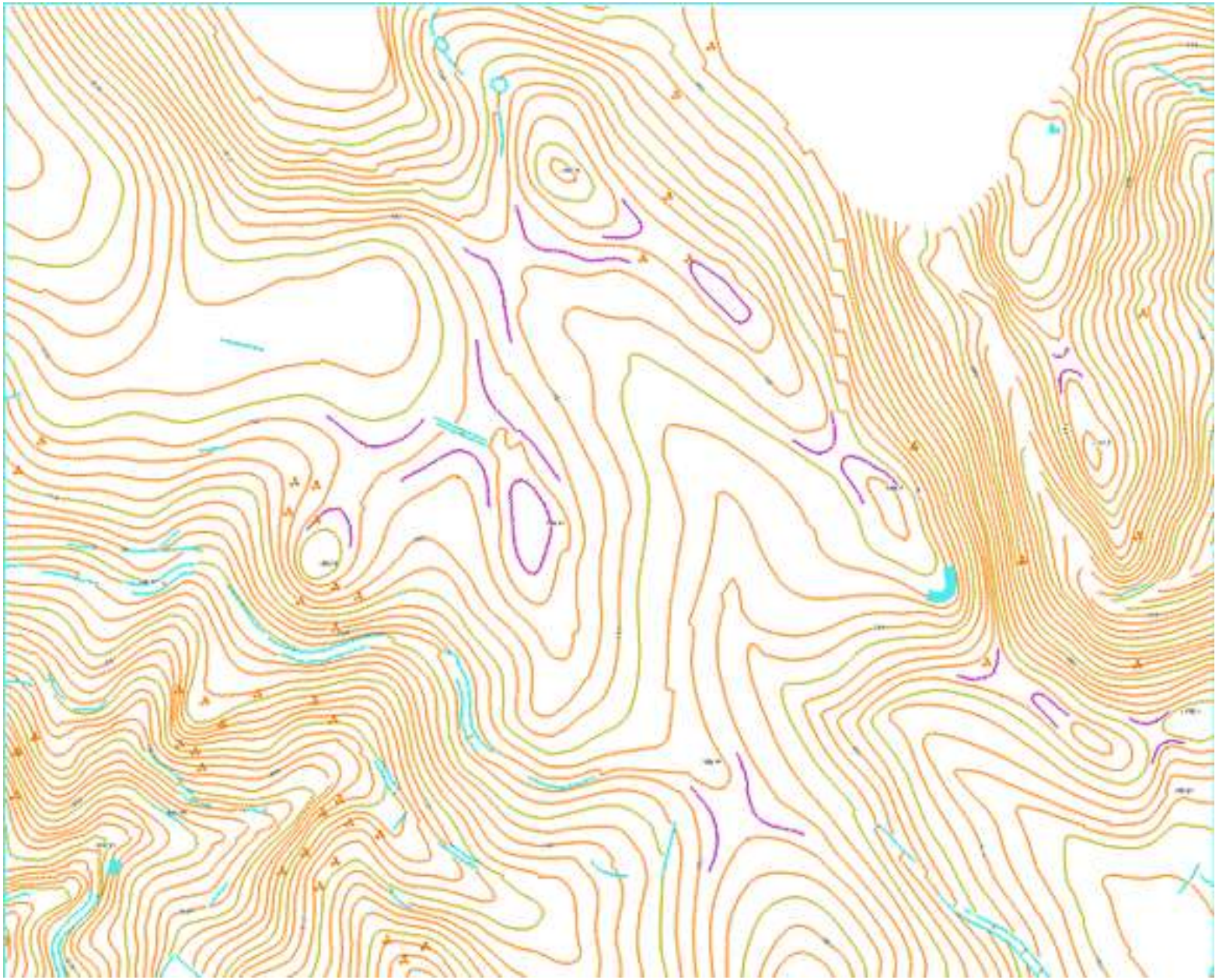
4. State map 1 : 5 000

- these maps have been compiled since 2001,
- derived 1:5000 state maps should be replaced by these maps

maps have 3 components:

1. cadastral component – on the basis of the digital cadastral map
2. altimetry – on the basis of ZABAGED
3. topographic component – on the basis of aerial survey photographs


chráněná krajinná oblast
Jizerské hory
Janov
nad Nisou
Hrabětice
Karlov



ZABAGED

Fundamental Base of Geographic Data

- digital topographic model of the Czech Republic on the basis of the basic map 1:10 000
- spatial information (planimetry, altimetry) + attributes (lettering and other information about objects) = 60 levels (layers)
- the base is created in MicroStation graphics environment
- photogrammetry is used for updating of survey data

Medium-scale maps

= topographic maps

Military maps (in Gauss-Krüger's projection) and civil maps (in Křovák's projection) have been developed since the end of World War II simultaneously in the Czech Republic. These maps differ in processing methods and in secrecy of some information (civil maps).

This lecture is only concerned with the civil maps.

Medium-scale maps

1. basic map 1 : 10 000
2. basic map 1 : 25 000
3. basic map 1 : 50 000
4. basic map 1 : 100 000
5. basic map 1 : 200 000

created on the basis of ZABAGED

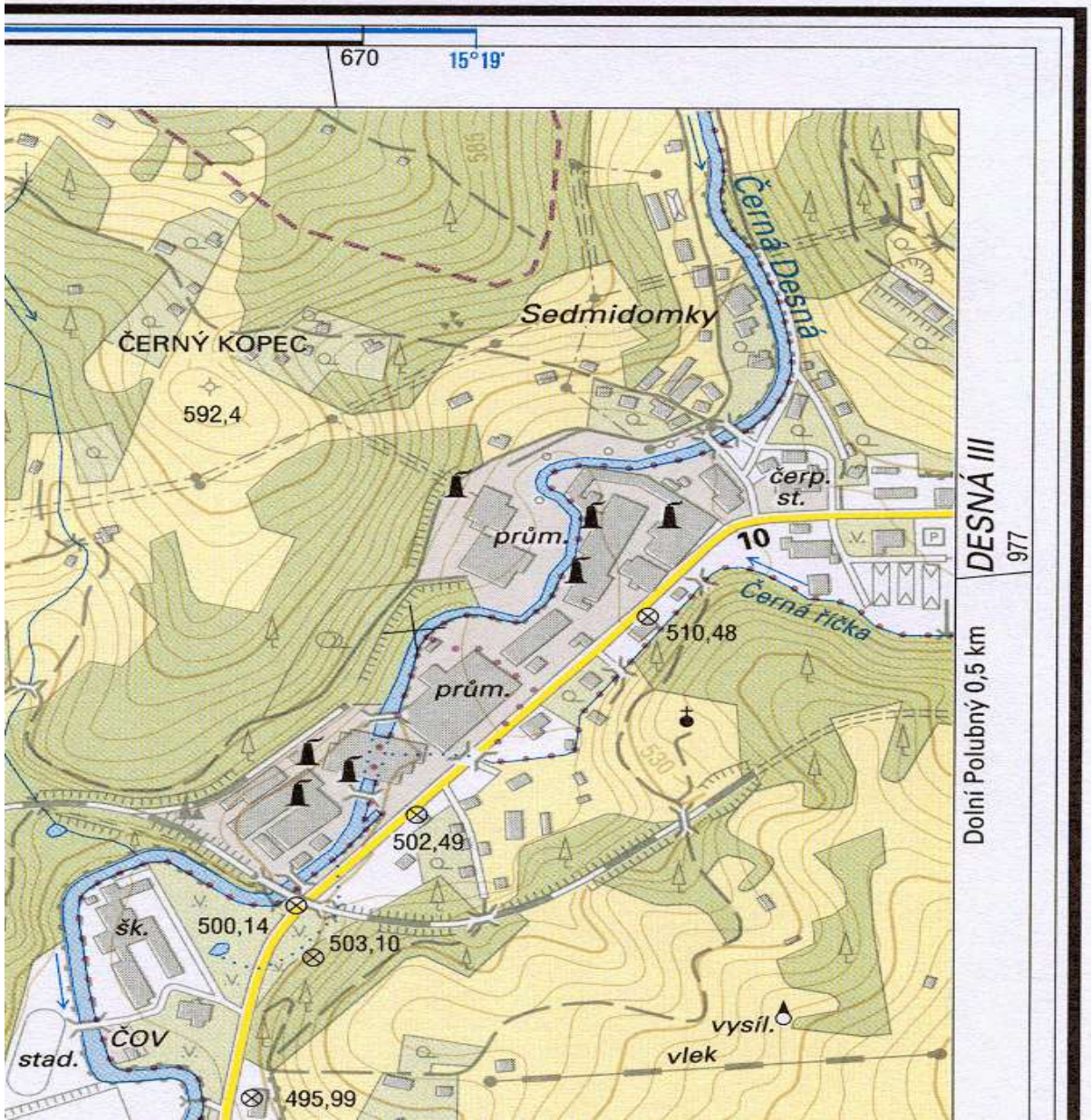
1. Basic map 1 : 10 000 created on the basis of ZABAGED

- maps have been published since 2001
- digital processing of maps
- planimetry – objects, residences, routes (ways), waters, boundaries of cadastral districts and administrative boundaries, growth and soil
- altimetry is expressed by means of contour lines and drop lines
- lettering – names on map, objects type designation, peak elevations and other information

Souřadnicový systém JTSK

Výškový systém baltský-po vyrovnání

Zeměpisná síť v souřadnicovém systému WGS84



6. Basic map 1 : 50 000 created on the basis of ZABAGED

- maps have been published since 2002
- planimetry, altimetry and lettering
- the only basic map on which even abroad map contents are displayed (areas near boundaries)
- various thematic maps are drawn on the basis of this basic map (some map components are supplemented), e.g. the basic map of water management, the road map, the geologic map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Czerniawski
Las
706523
NOVÉ MĚSTO
p.Smrkem
Ulisko
Lomnice
Malá Strana
U Lesa
CHKO JIZERSKÉ HORY
Ztracený p.
533
Rapická h.
708
Měděnec
777
Svinský v.
756
Lomnice
Přebytek
675
15°14'
Liberec
LIBERECKÝ KRAJ
ČR
POLSKO

Thematic maps for construction industry

- maps with special information, digital form of these maps is often used

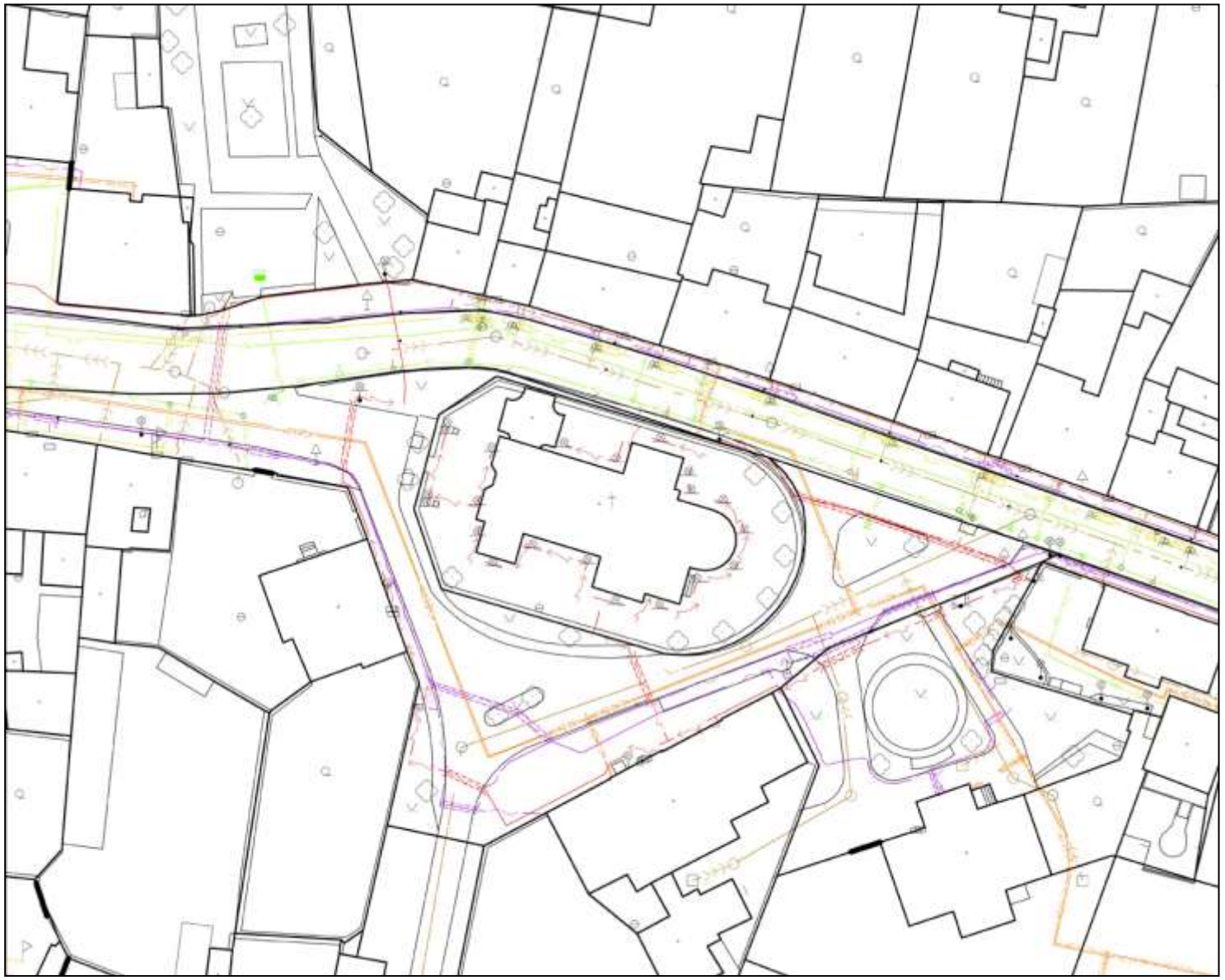
1. Technical map of a town
2. Basic map of a plant
3. Uniform railway map

+ other thematic maps (mine maps, basic maps of motorways, basic map of a quarry etc.)

1. Technical map of a town

- 1:500, on the fringe areas of the town 1:1000
- planimetry with both underground and overground gas distribution system, system of pipes, telephone network, water distribution system and other lines which are differentiated by a type of symbol (usually a line) and its colour in map
- municipality bears the mapping expenses

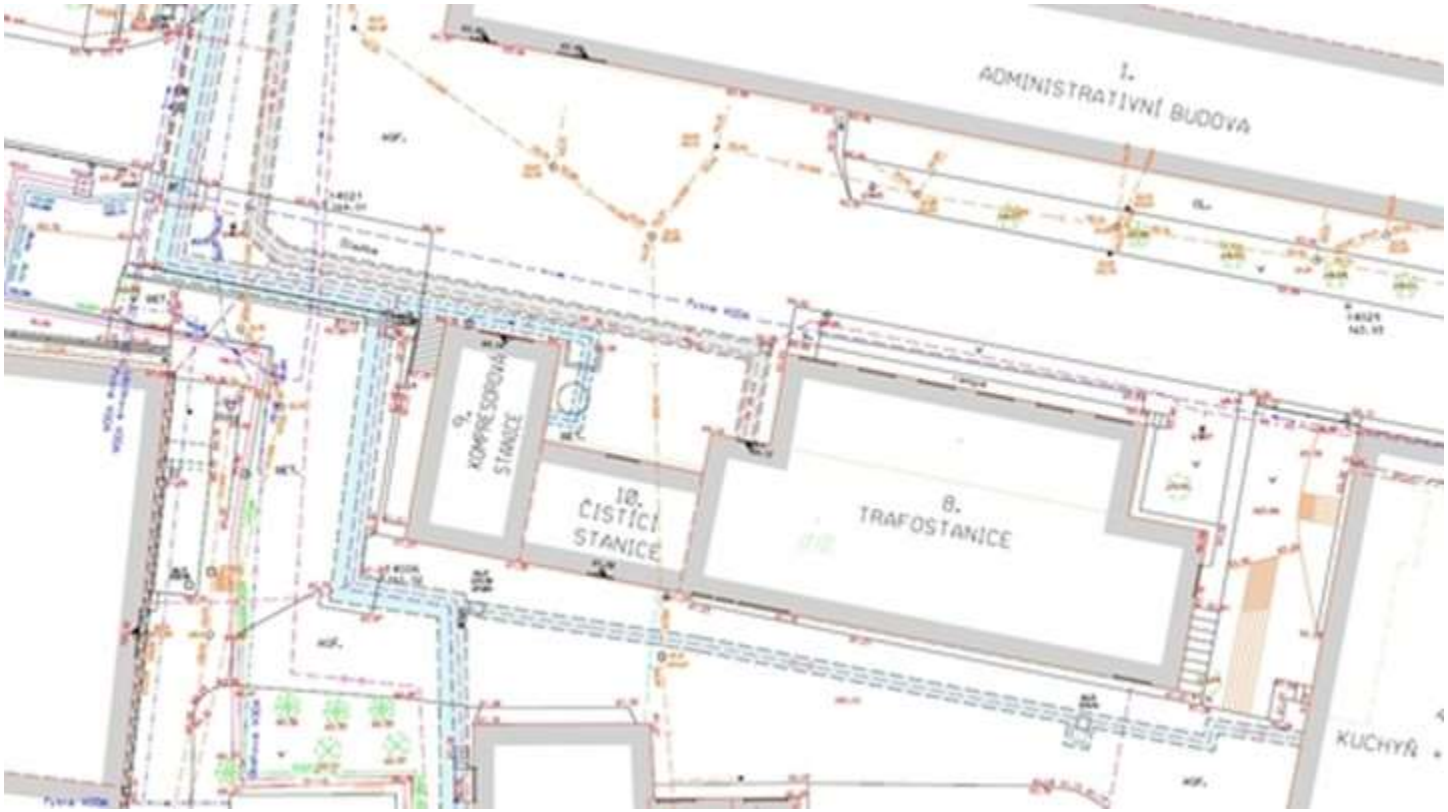
Example of technical map of town (Prague)



2. Basic map of a plant

- scale from 1:200 to 1:1 000
- networks, constructions, control equipments, trees etc.

Basic map of a plant - example



3. Uniform railway map

- 1:1000 or 1:500
- track equipment, railway buildings, subgrade and its facilities
- secret map

Thank you for your attention!