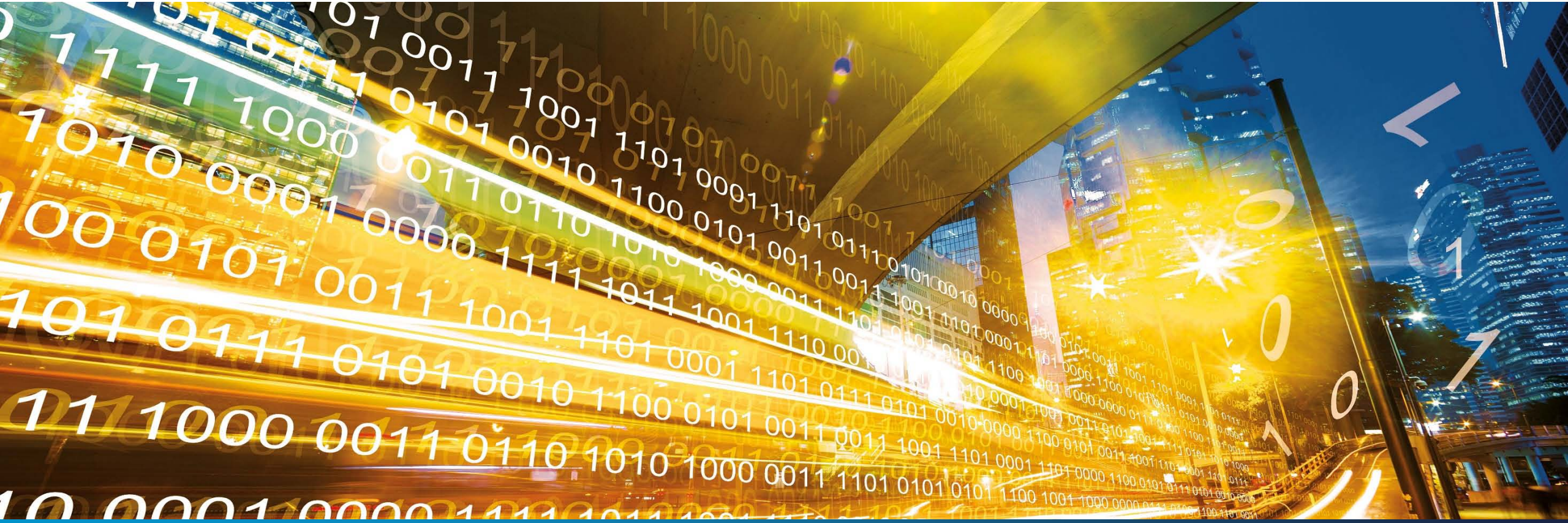
Kartverket

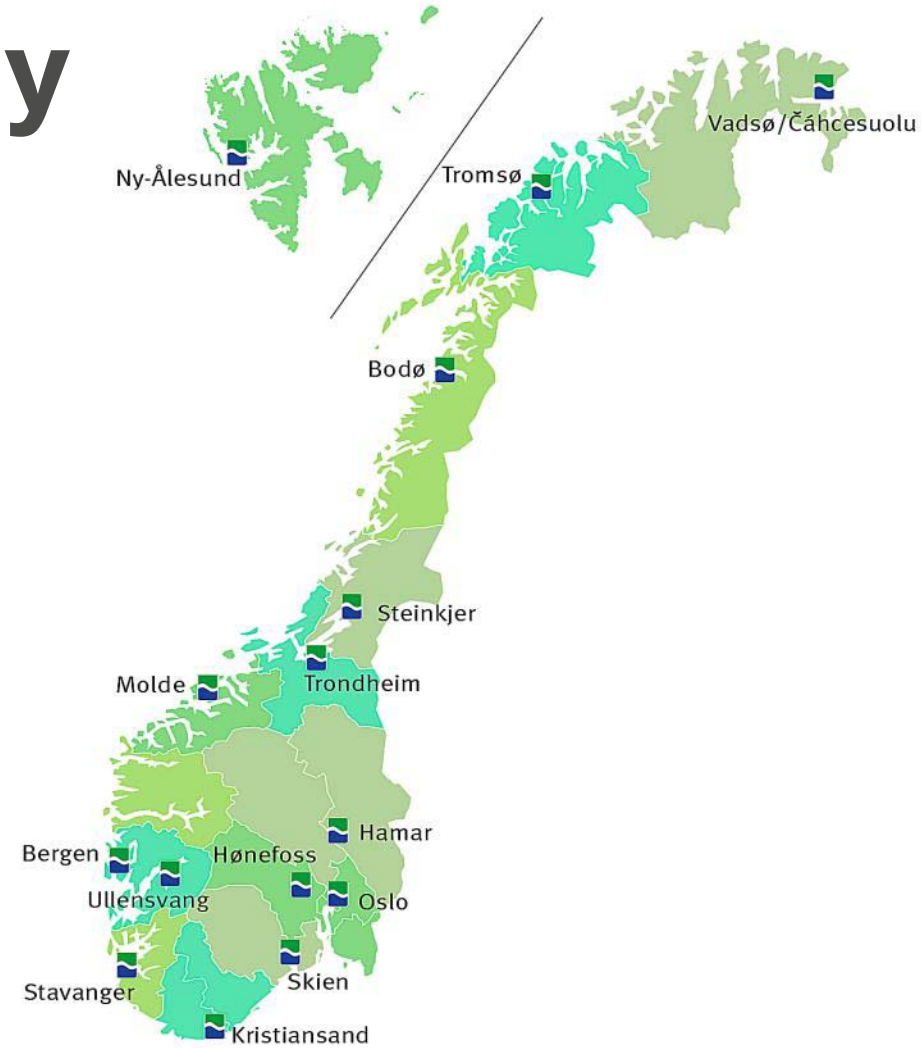
Administrative datacapture

Ståle Haug. www.kartverket.no



The Norwegian Mapping Authority

- 15 regional locations
- Head office at Hønefoss
- 850 staff
- Turnover for 2014: kr 1,1 billion



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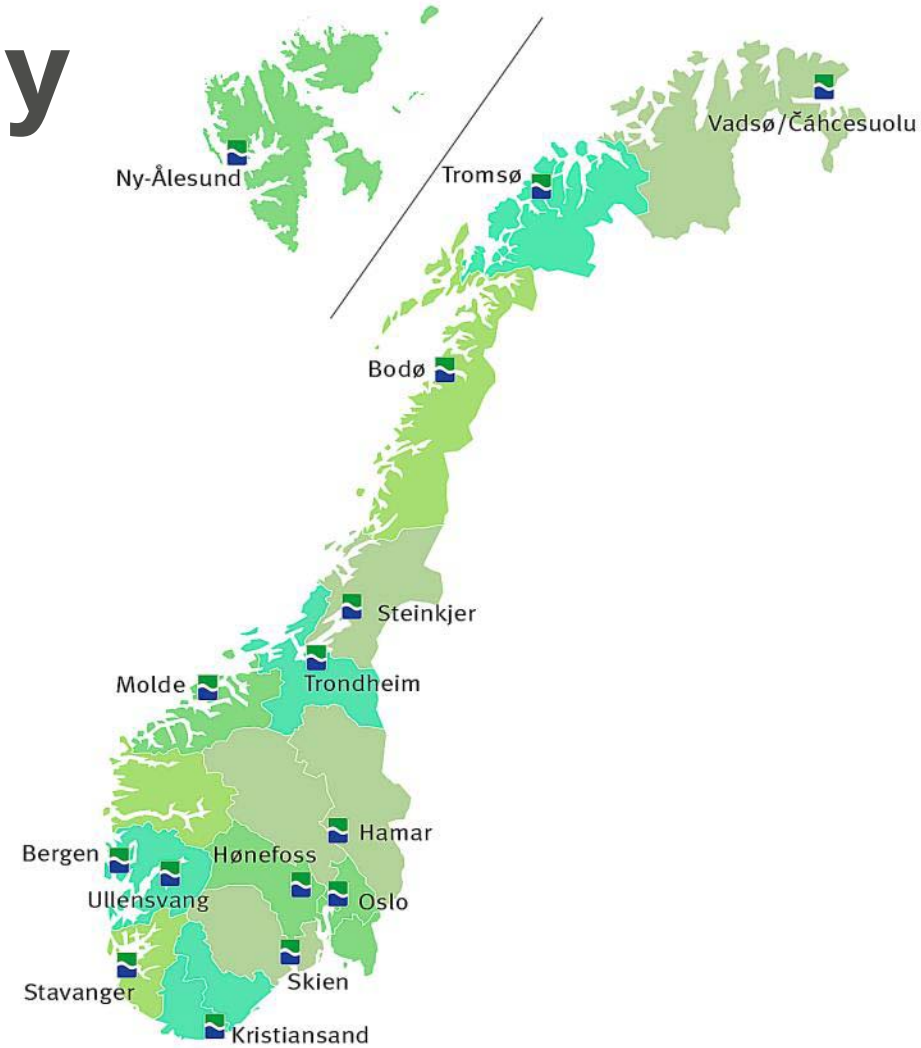
The Norwegian Mapping Authority

- Nautical division in Stavanger.
- Production for 1:50 000 and smaller scales is done at head office in Hønefoss.
- 1:500-1:5 000 production is done at regional offices.



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Topographic databases 1:50’-1: 5 000’

1: 5 000 000

1: 2 000 000

1: 1 000 000

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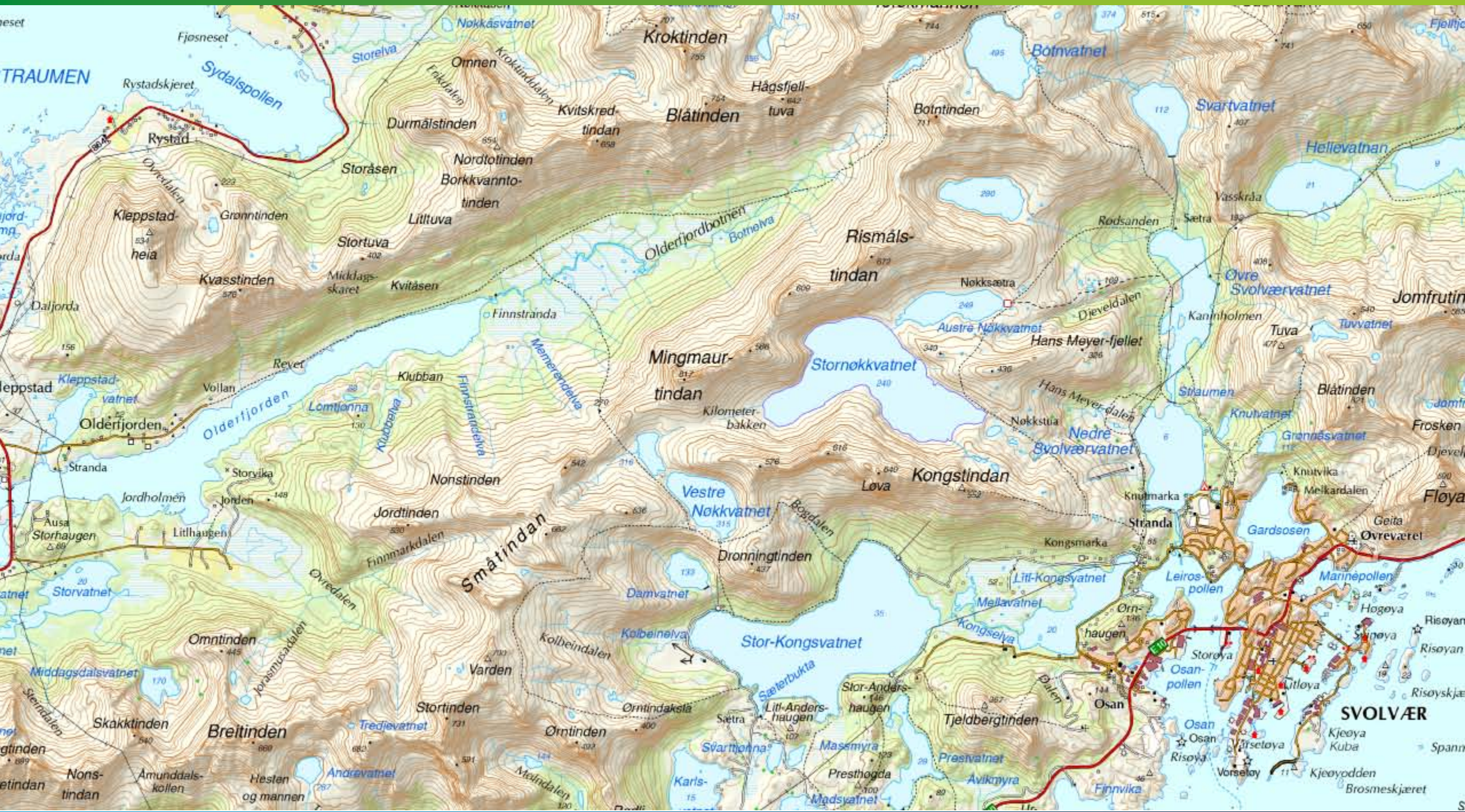
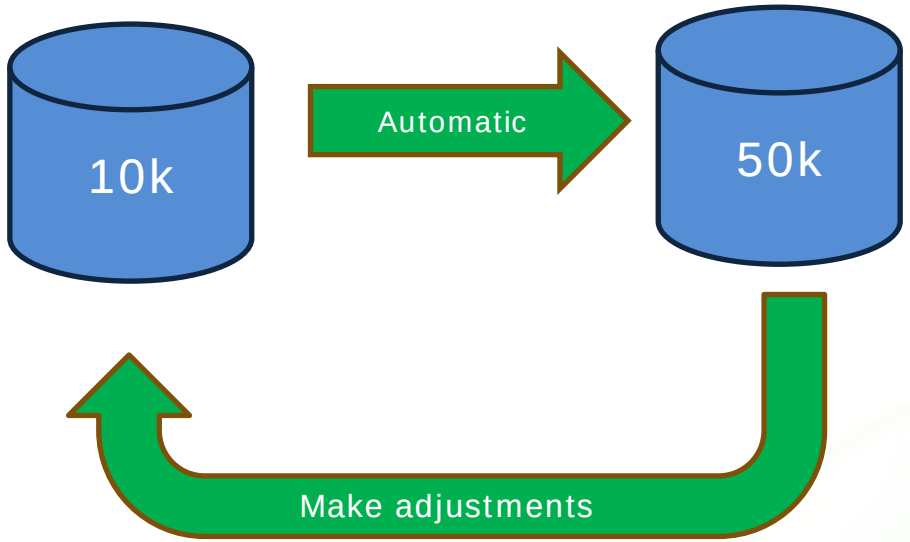
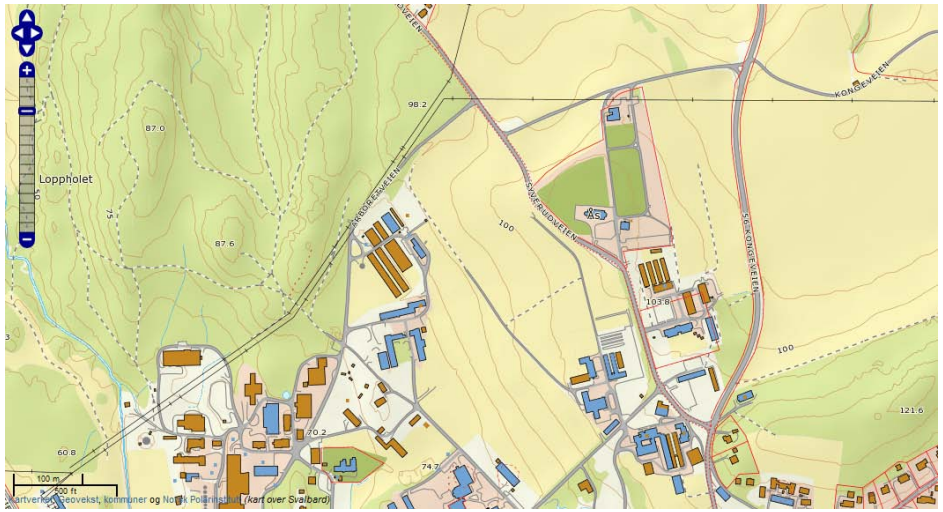
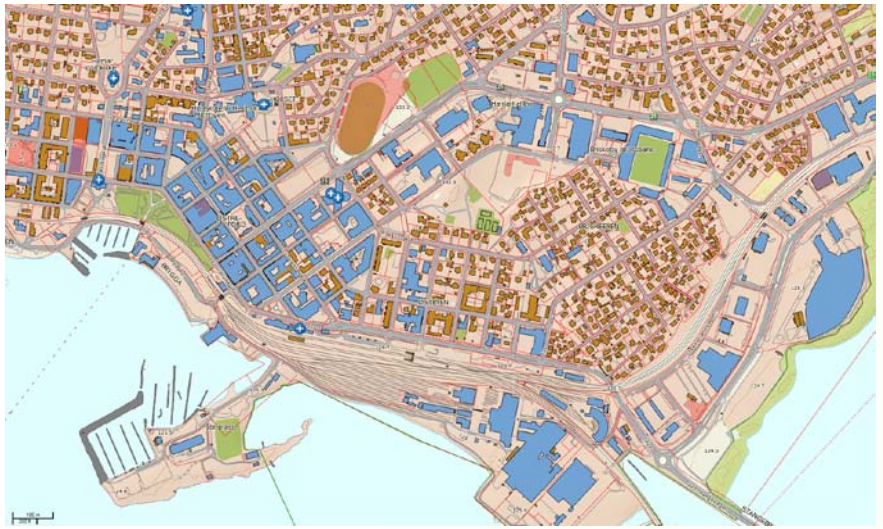

Fjøsneset
Nøkkåsvatnet
Kroktinden
Botnvatnet
TRAUMEN
Rystadskjeret
Sydalspollen
Storelva
Omnen
Kroktindalen
Erkdalen
Hågsfjell-
tuva
Botntinden
Svartvatnet
Durmålstinden
Kvitskred-
tindan
Blåtinden
Rystad
Nordtotinden
Hellevatnan
Storåsen
Borkkvannto-
tinden
Øvredalen
Vasskråa
Kleppstad-
heia
Grønntinden
Litltuva
Rødsanden
Sætra
Olderfjordbotnen
Botnelva
Rismåls-
tindan
Stortuva
Øvre
Svolværvatnet
Mikdlags-
skaret
Kvitåsen
Kvasstinden
Nøkksætra
Jomfrutin
Daljorda
Finnstranda
Djeveldalen
Austre Nøkkvatnet
Kanninholmen
Tuvvatnet
Tuva
Hans Meyer-fjellet
Revet
Mingmaur-
tindan
Stornøkkvatnet
Klubban
Meieren
Kleppstad-
vatnet
Vollan
Hans Meyer-dalen
Straumen
Blåtinden
Lomtjønna
Olderfjorden
Kilometer-
bakken
Nøkkstua
Knutvatnet
Frosken
Nedre
Svolværvatnet
Grønnåsvatnet
Stranda
Storvika
Nonstinden
Løva
Kongstindan
Knutvika
Melkardalen
Fløya
Jordholmen
Jorden
Vestre
Nøkkvatnet
Knutmarka
Stranda
Geita
Gardsosen
Øvreværet
Ausa
Storhaugen
Litlhaugen
Jordtinden
Bogdalen
Kongsmarka
Finnmarkdalen
Småtindan
Dronningtinden
Litl-Kongsvatnet
Leiros-
pollen
Marinepollen
Storvatnet
Damvatnet
Mellavatnet
Høgøya
Øvredalen
Ørn-
haugen
Risøyan
Kongselva
Omntinden
Kolbeinelva
Stor-Kongsvatnet
Storøya
Risøyan
Middagsdalsvatnet
Kolbeindalen
Osan-
pollen
Jørasmusdalen
Varden
Litløya
Risøyskjæ
Sæterbukta
Stor-Anders-
haugen
Osan
SVOLVÆR
Stortinden
Ørntindakstla
Litl-Anders-
haugen
Tjeldbergtinden
Skakktinden
Breitinden
Sætra
Tredjevatnet
Ørntinden
Svartlønna
Masemyra
Osan
Kjeøya
Kuba
Presthøgda
Prestvatnet
Risøya
Vorsetøya
Spann
Nons-
tindan
Amunddals-
kollen
Hesten
og mannen
Andrevatnet
Karls-
Avikmyra
Vorseløy
Kjeøyodden
Madsvatnet
Finnvika
Brosmeskjæret

In a perfect world.....



Most detailed database: FKB





- Covers approx. 60% of Norway (populated areas)
- 1:500 – 1:5 000
- The database is a cooperation between local authorities, NMAs regional offices and other public companies

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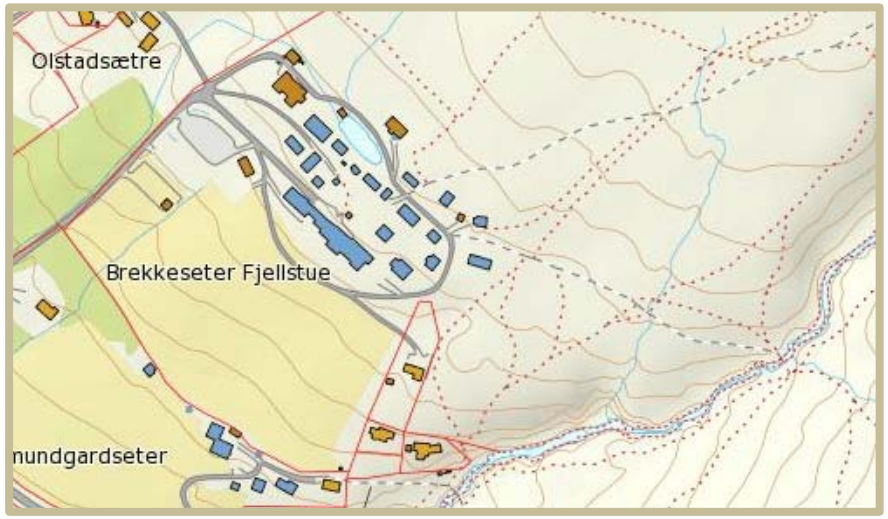
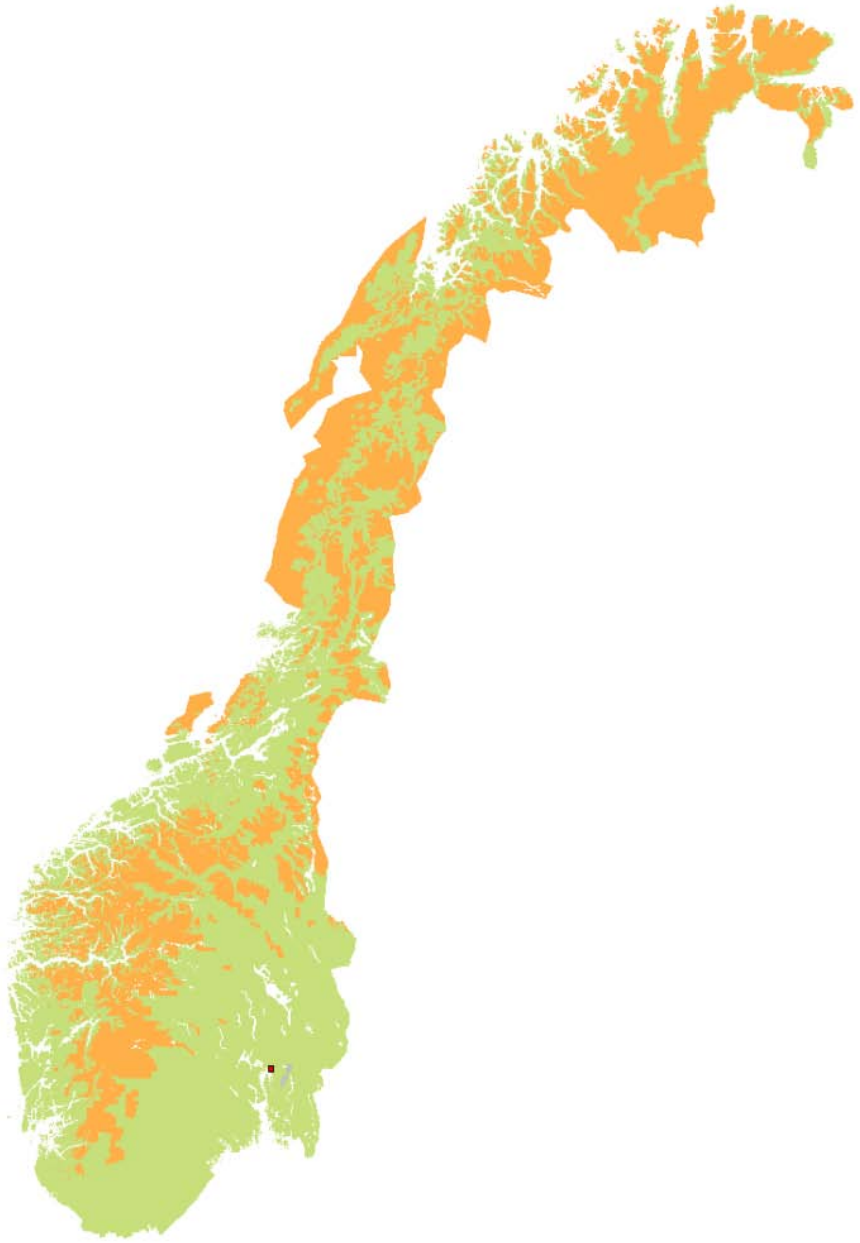
Coverage FKB





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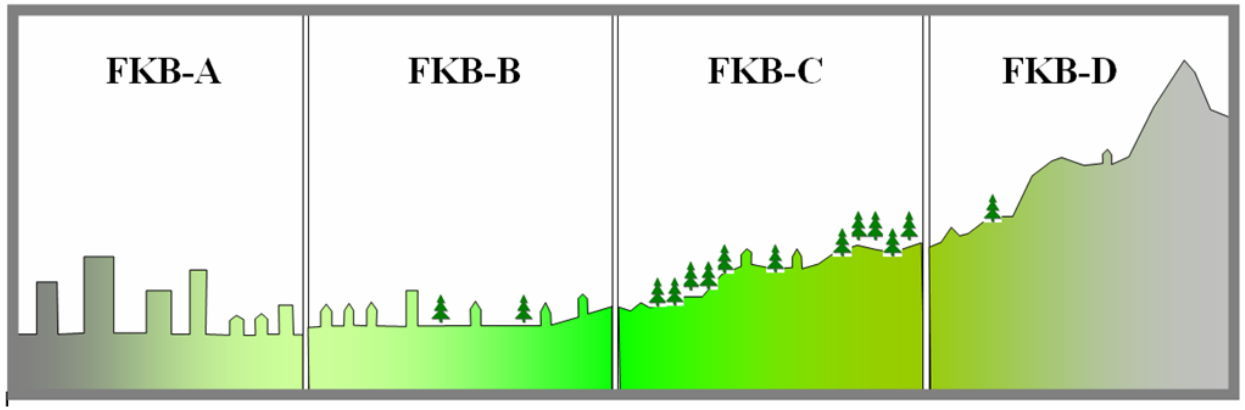
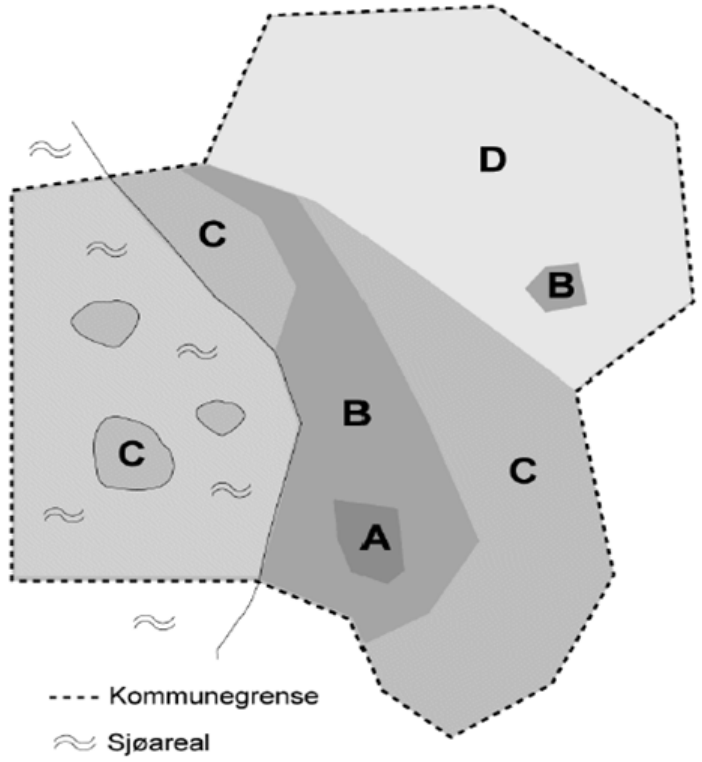

FKB-A
FKB-B
FKB-C
FKB-D

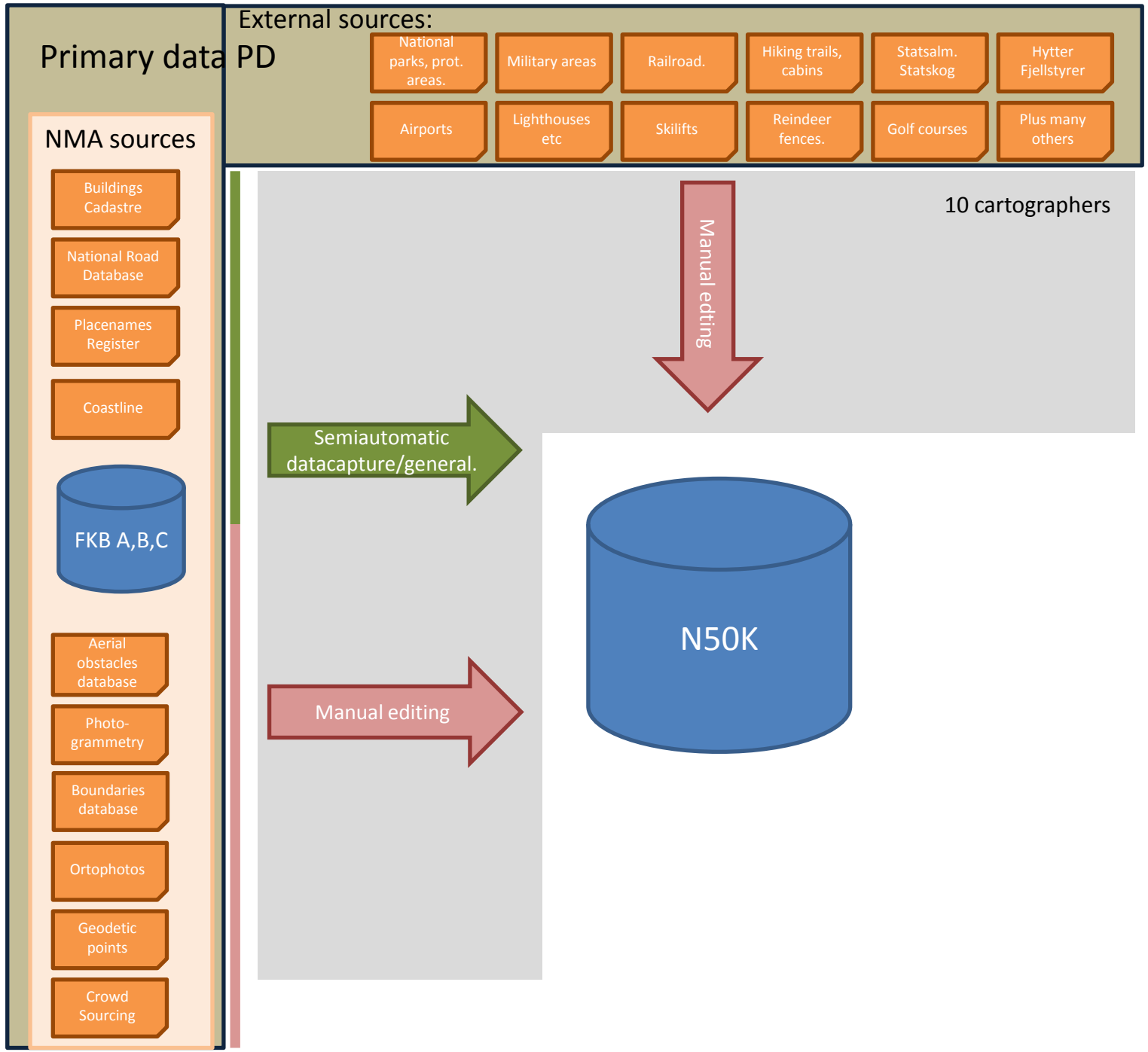

D
C
B
B
C
C
A
Kommunegrense
Sjøareal

We don’t have any nationwide large-scale database available. What to do?

Administrative datacapture

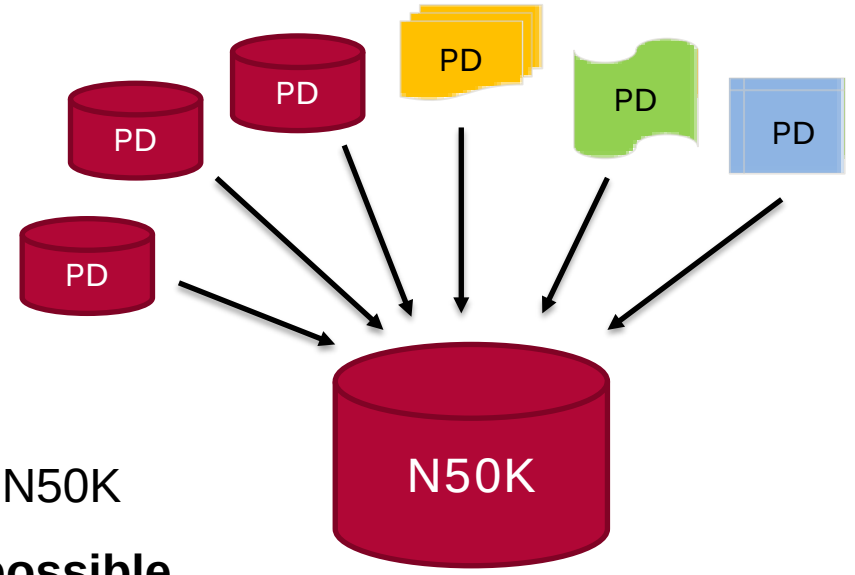
Methods for updating N50K

- Automatic generalization → administrative boundaries
- Photogrammetric data capture → land use, height curves
- Crowdsourcing → www.rettikartet.no (‘FixTheMap’)
- Digitizing from orthophoto
- No surveying in the field
- **Mainly administrative datacapture**


Primary data PD
NMA sources
Buildings Cadastre
National Road Database
Placenames Register
Coastline
FKB A,B,C
Aerial obstacles database
Photo-grammetry
Boundaries database
Ortophotos
Geodetic points
Crowd Sourcing
External sources:
National parks, prot. areas.
Military areas
Railroad.
Hiking trails, cabins
Statsalm. Statskog
Hytter Fjellstyrer
Airports
Lighthouses etc
Skilifts
Reindeer fences.
Golf courses
Plus many others
10 cartographers
Manual eding
Semiautomatic datacapture/general.
Manual editing
N50K

Administrative datacapture

- Deriving updated data (changes) from different primary data sources
- Dedicated prosesses/workflows for each feature type
- Manually or automatically
- Flexible – no big and complex system (no full generalization)
- 50 000-data are not replaced but updated
- Issues:
  - Are changes accessible?
  - What is relevant for 1:50 000?
  - Generalizing primary data
  - Updating 1:50 000-data
  - Establish/retain link between PD – N50K
- → **Main goal: automate as much as possible**



Kartverket

Administrative data capture - Challenges

- How to access the primary data? (public or not; original data or products)
- Format
- Data owner
- Extent
- Data Quality
- Status of data (updated)
- Scale of the data
- Geographical objects/tabular data
- **How to extract changes (query/analyze)?**

.....

Some feature types are more important than others (roads, buildings, placenames).

N50K must be updated within one week of the main primary data sources.

We must be able to access all primary data sources from ArcGIS

To be efficient, we have to detect the changes in the source data made during the last week.

We only want changes which are relevant for N50K

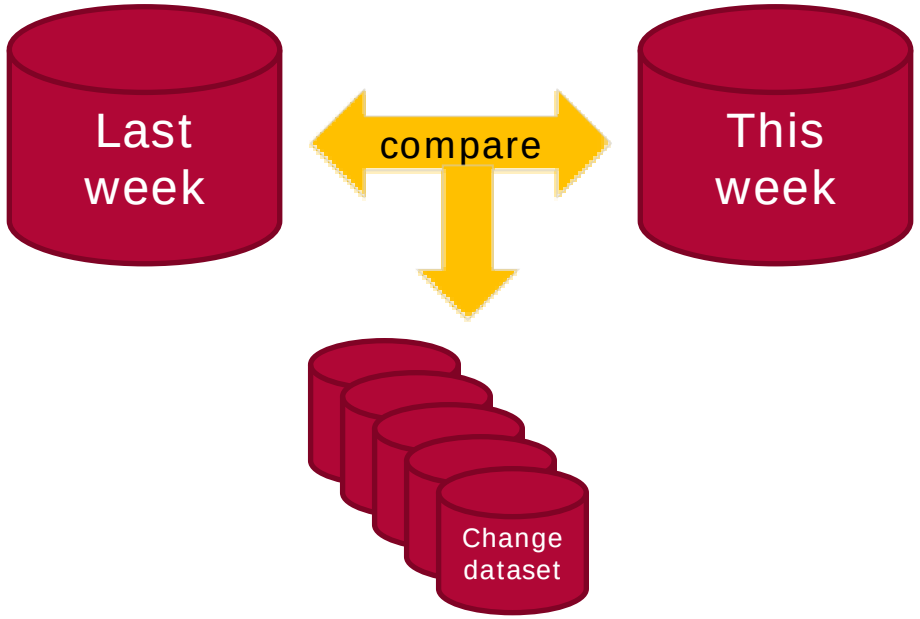
If possible, the change-dataset should be generalized and facilitated.

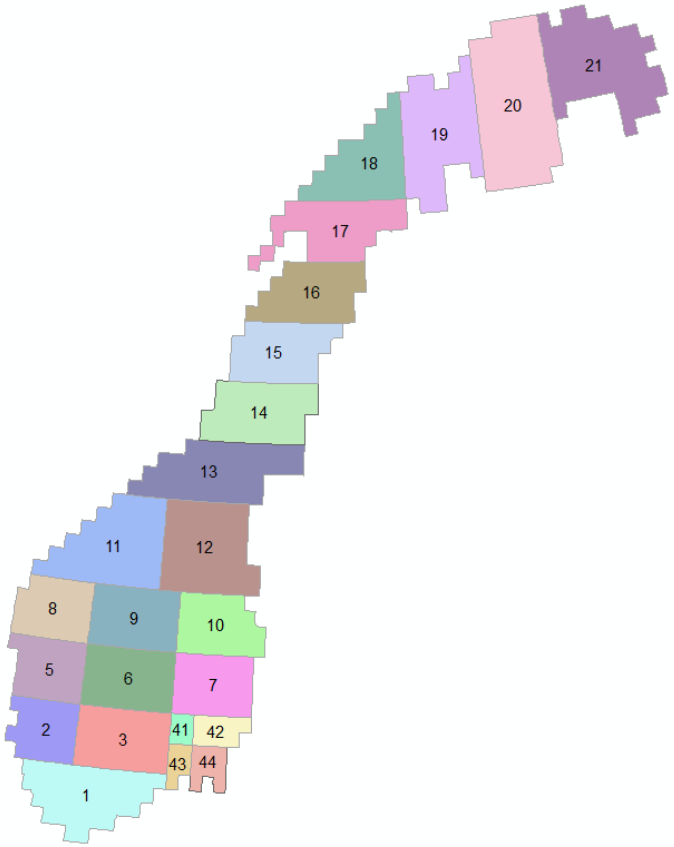
We must automatically detect changes in the ptimary data, generate change-datasets to identify objects and manually update N50K.

Detecting changes in primary data

Find changes by comparing 2 versions of primary data

(geometrically and fieldvalue-based)





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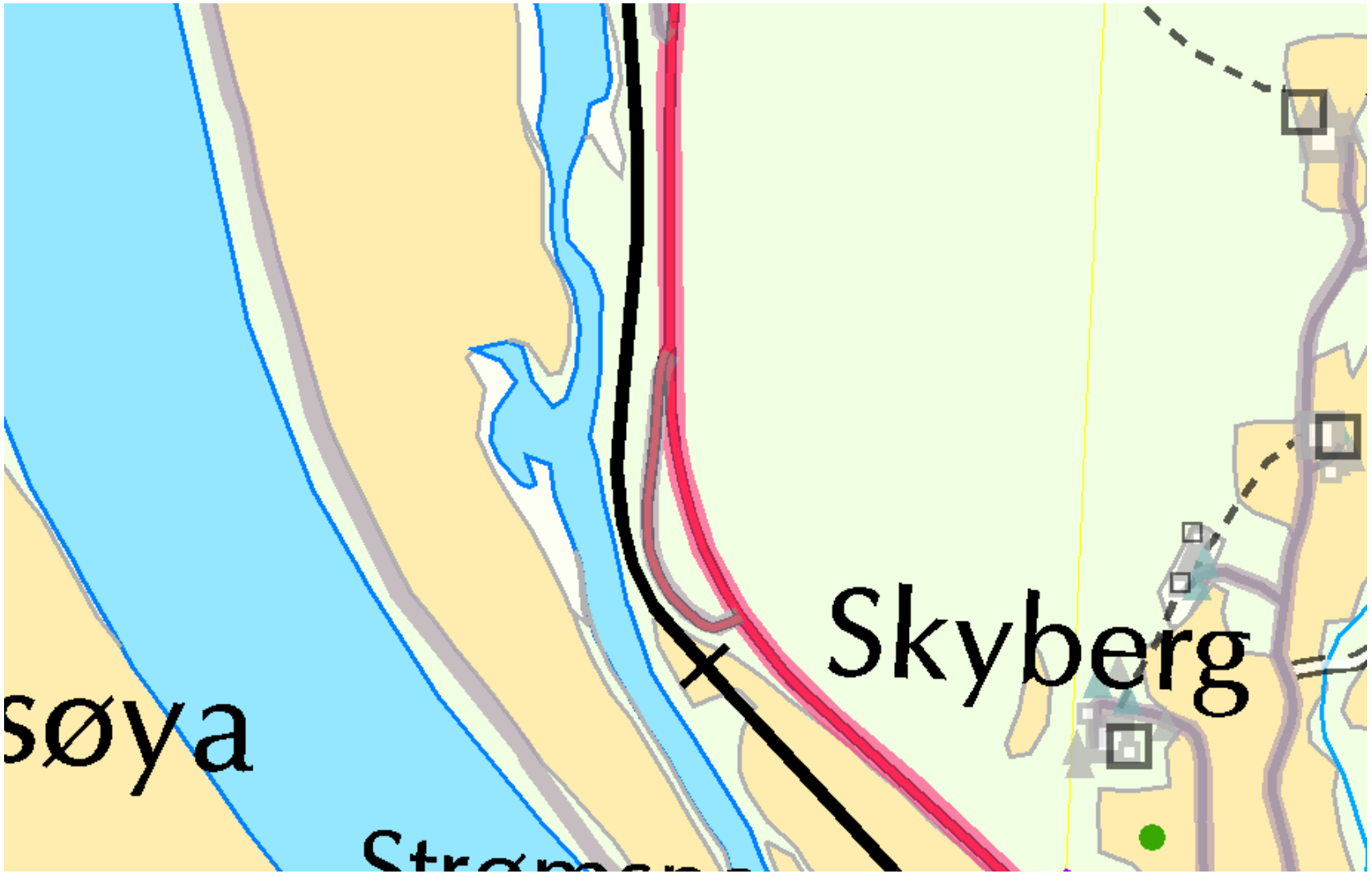
Example: Roads (1)

- Data source: National Road Datavase; nationwide coverage
- We must access a weekly updated PostGIS-database (used for WEB-services)
- No change-log is available

Roads (2)

- Converting and manipulating lines and points with FME
- Change detection in ArcGIS (model-builder, python-script)
  - Compare data with data from last week
  - Geometry-changes greater than 5m (buffer)
  - Attribute-changes (roadtype, medium, roadnumber)
  - Classifying changes (new, remove → over 5m, attribute-changes → under 5m)
  - Sorting changes by length (descending)

Changed road-type



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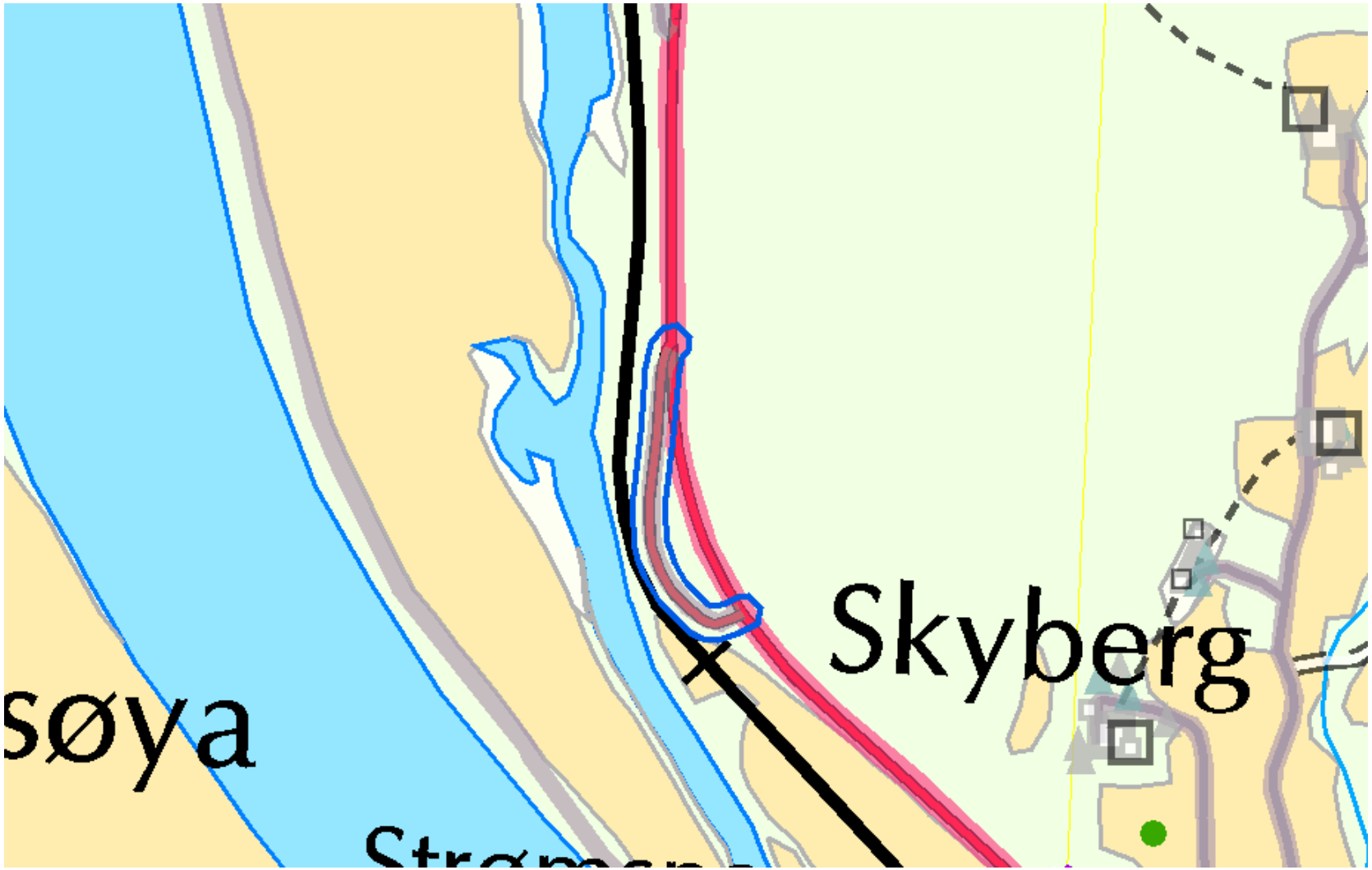
Changed road-type



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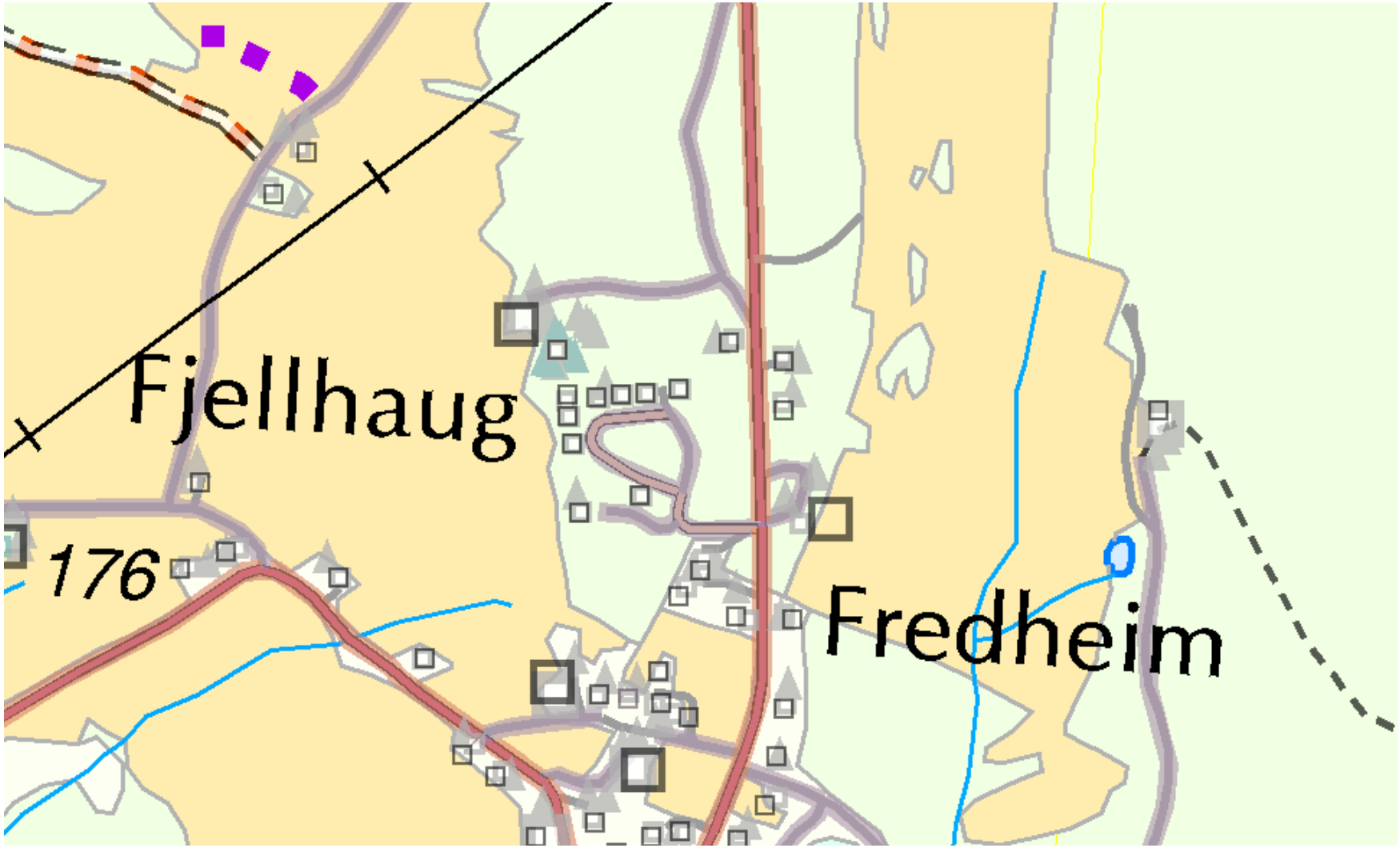
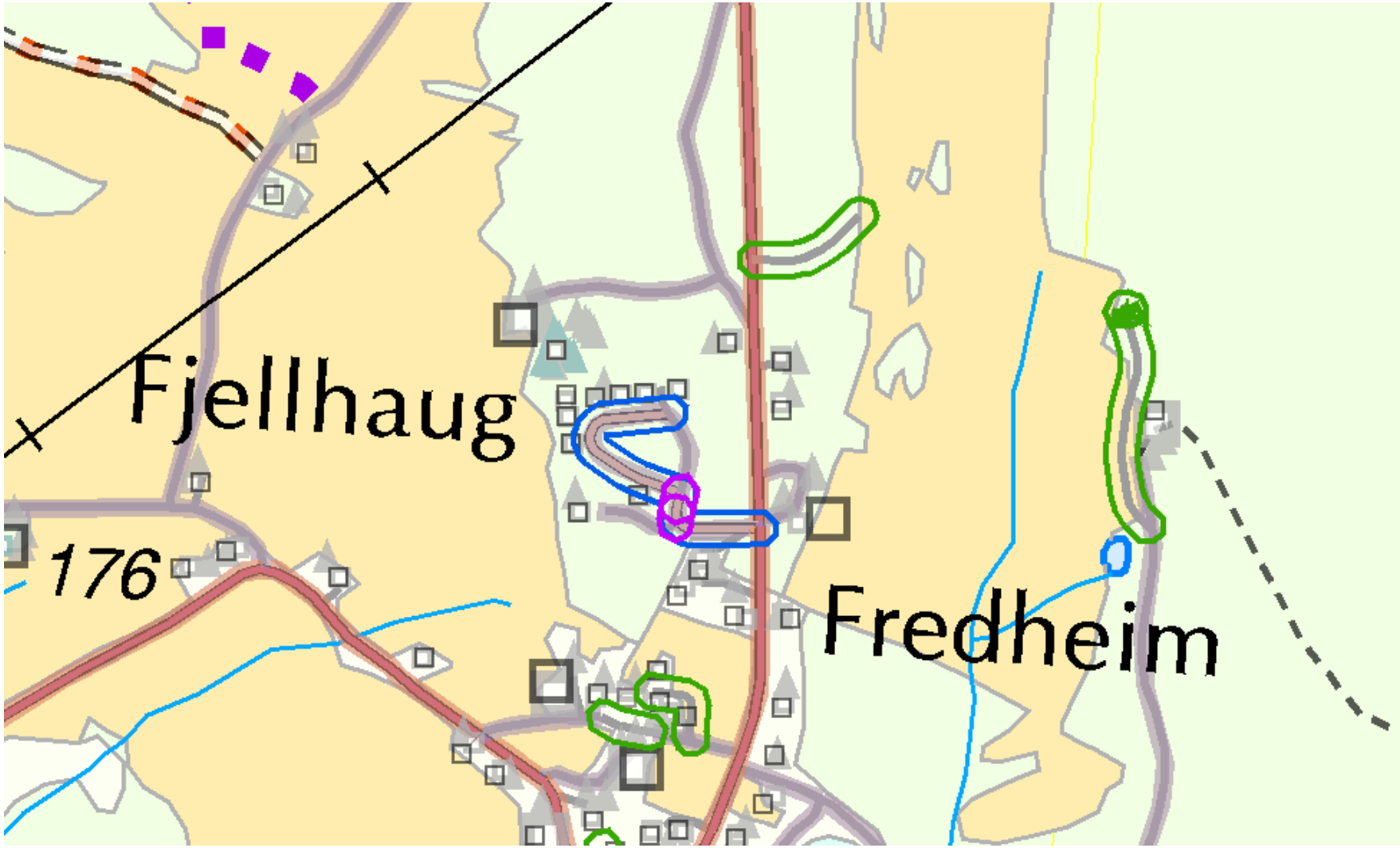
Several changes



Kartverket

Several changes



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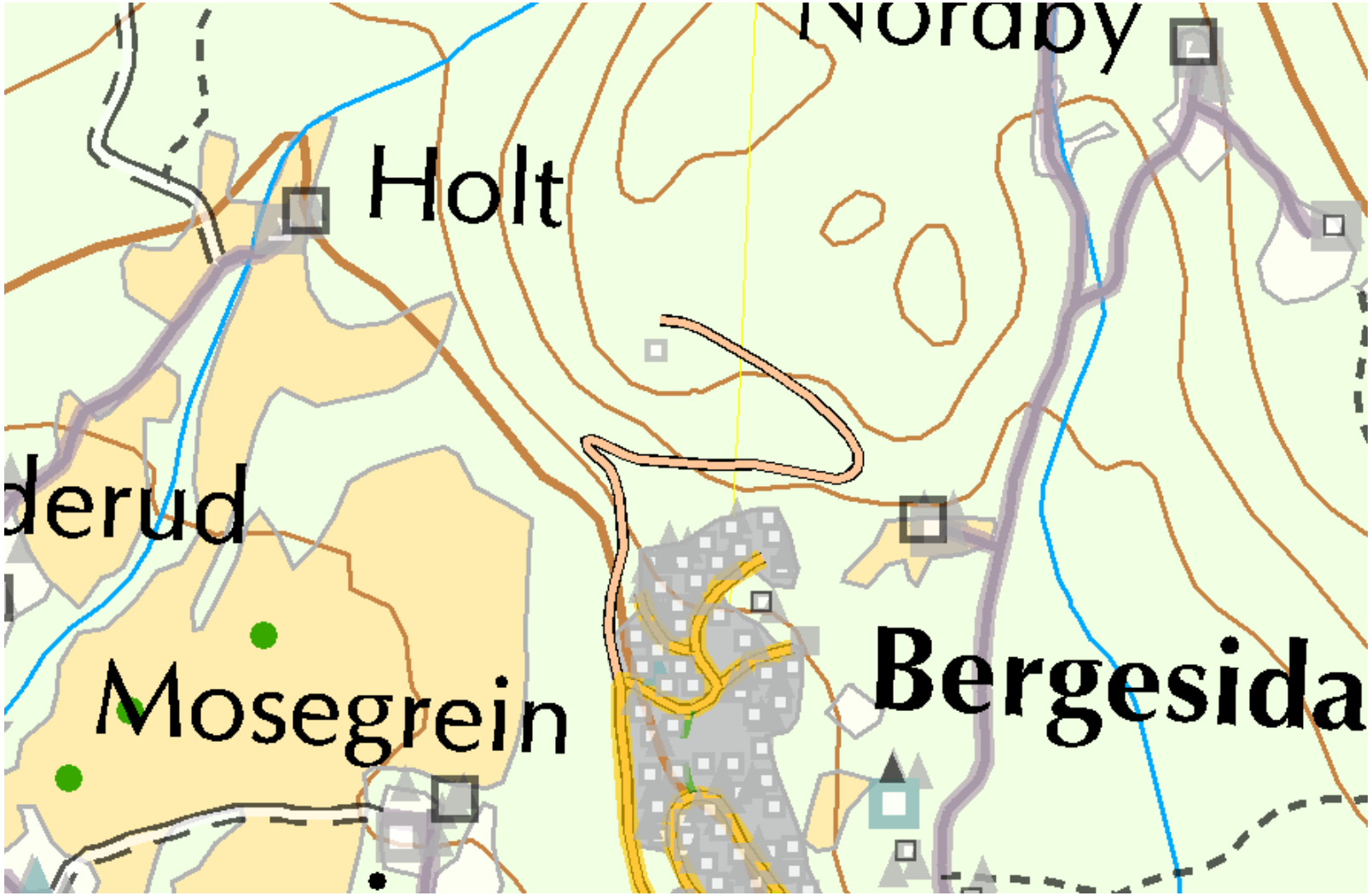
New road



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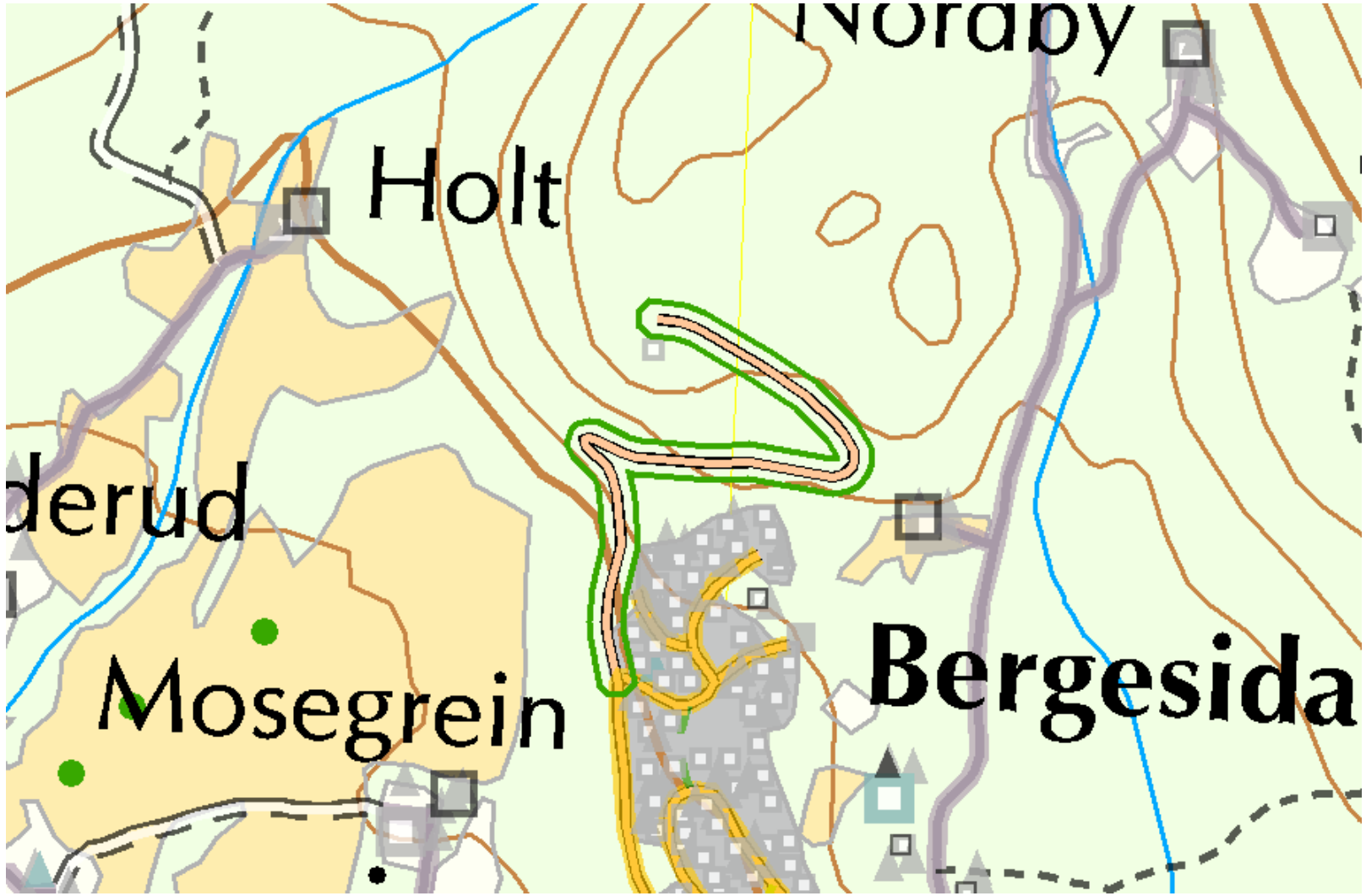
New road



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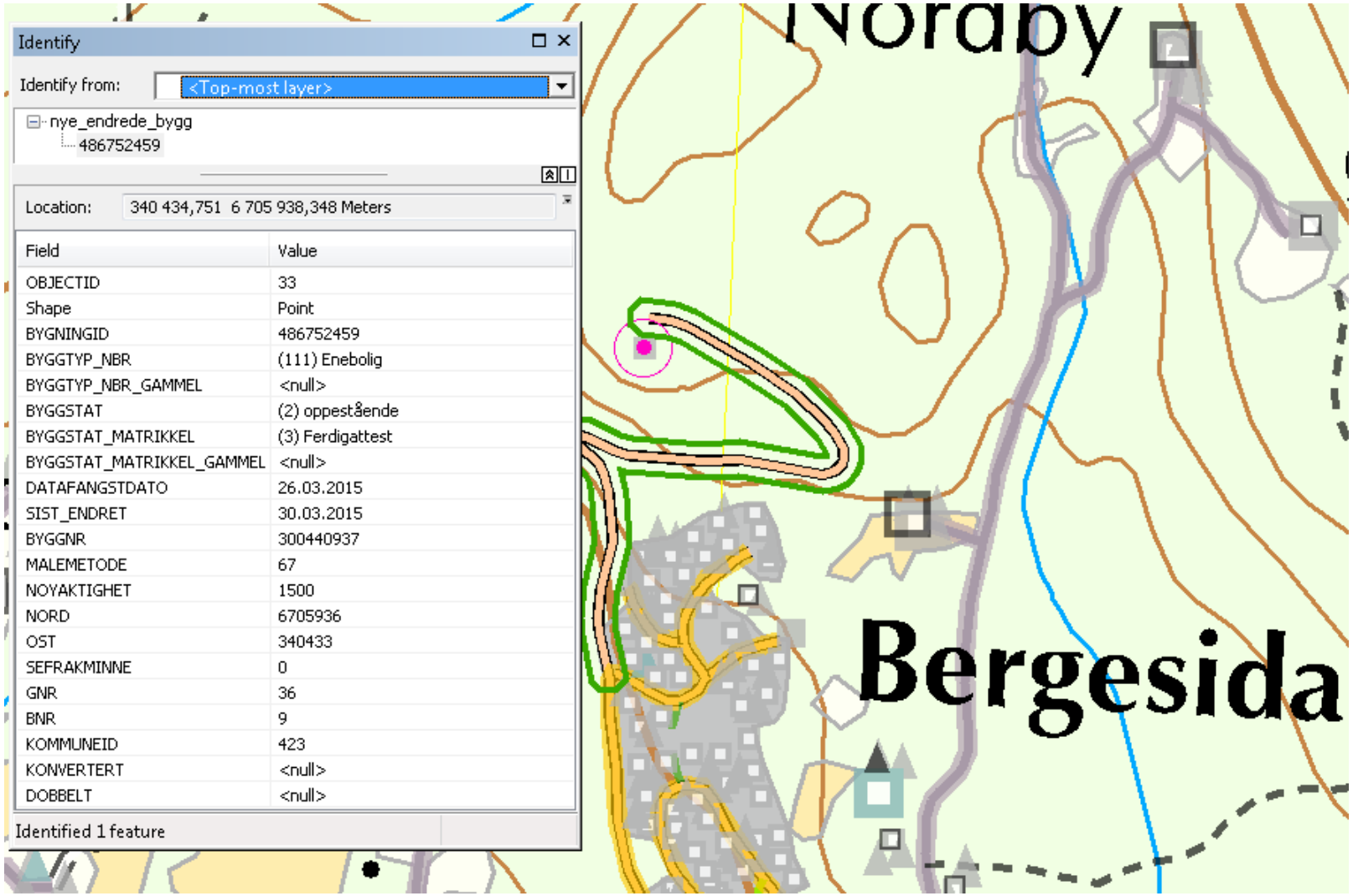
New road



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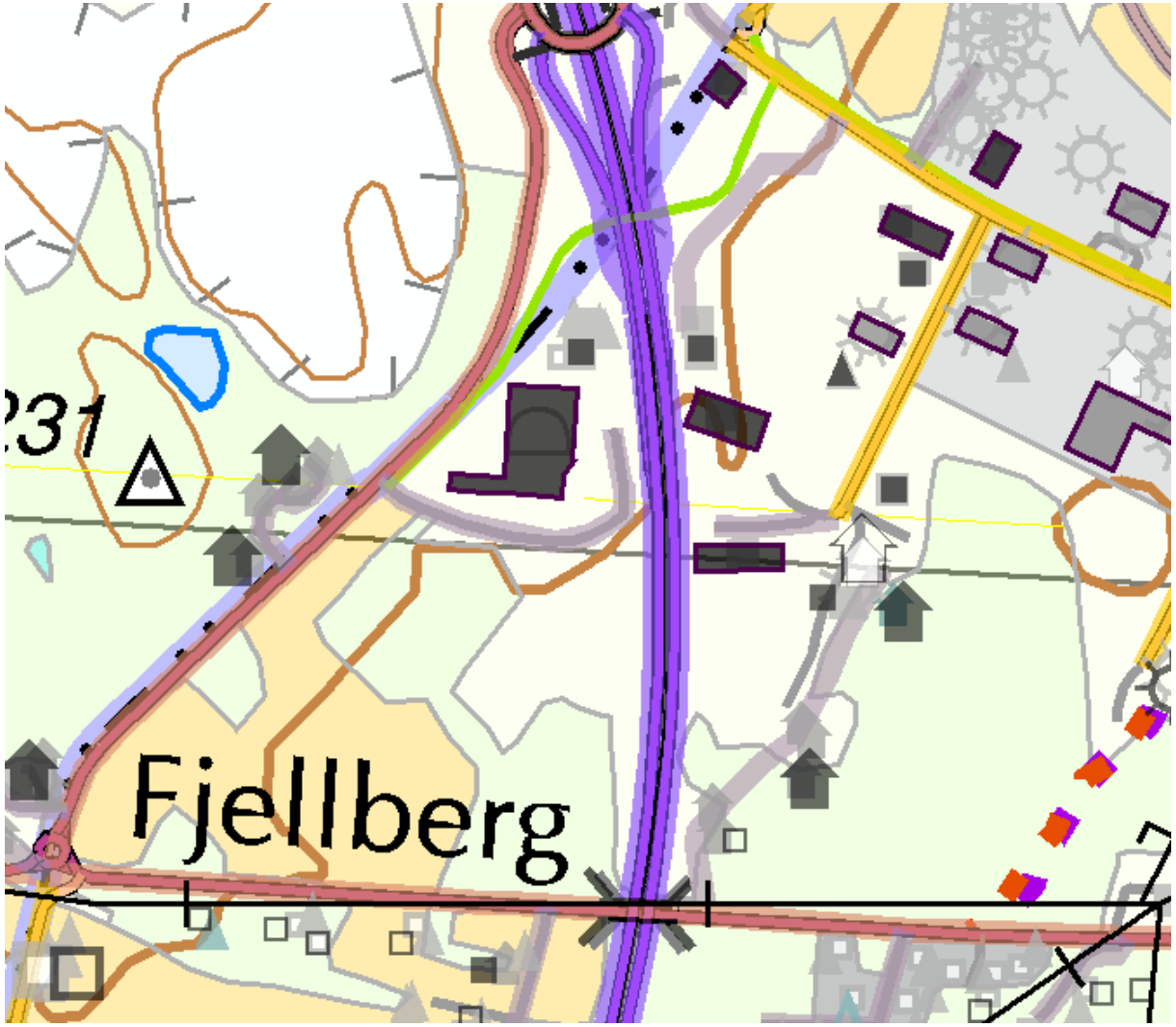
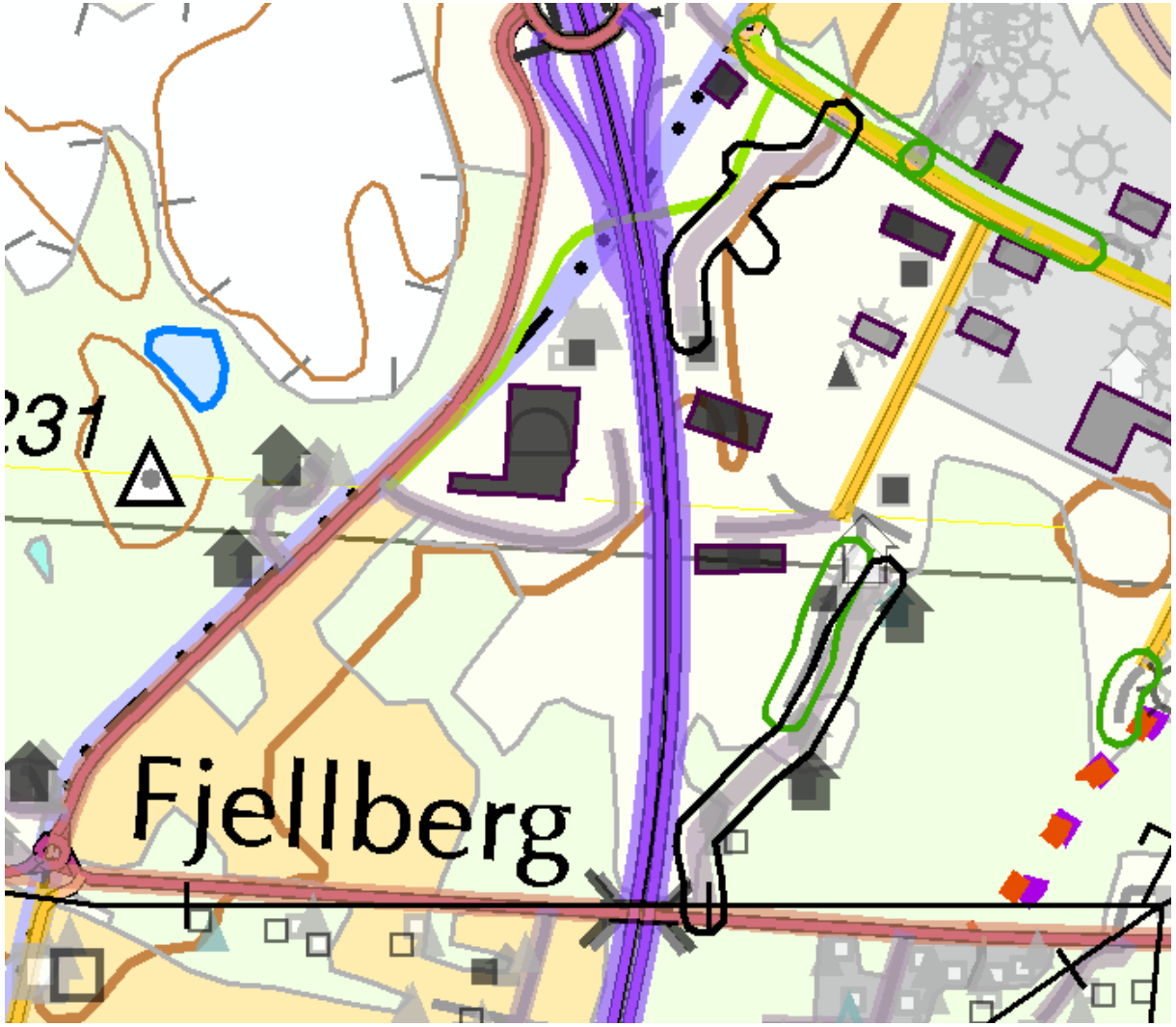
Delete road



Kartverket

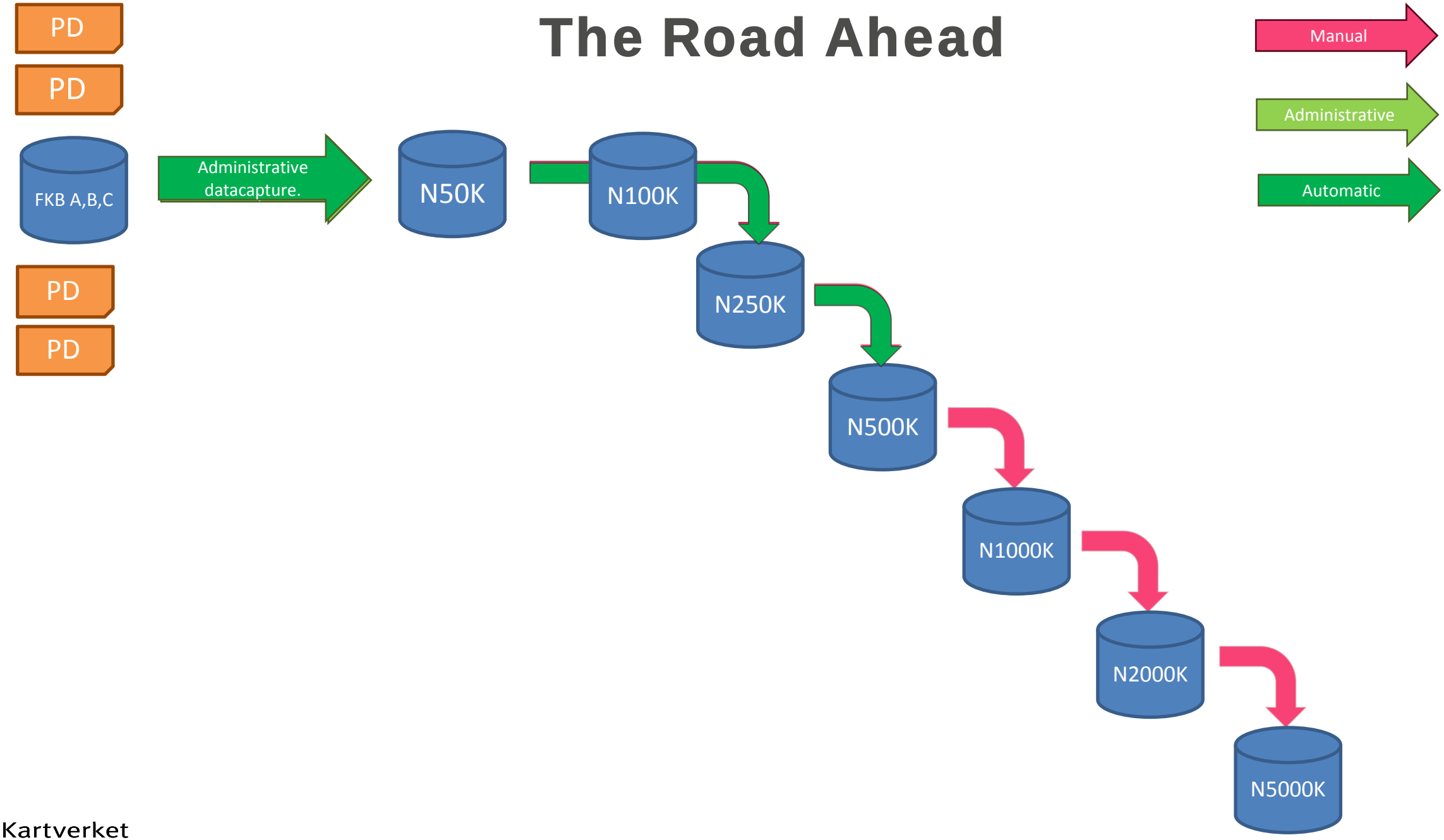
Delete road



And of course – at the other end of the production line

- Weekly data delivered in different formats (ESRI filegeodatabase, PostGIS, SOSI, TIFF, MrSid)
- Weekly update of WMS
- From Sept 1st 2015: No more printed maps!
- (Except we still need to print 50k maps for the Army)
- But all data are free and available for everybody!

The Road Ahead



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