



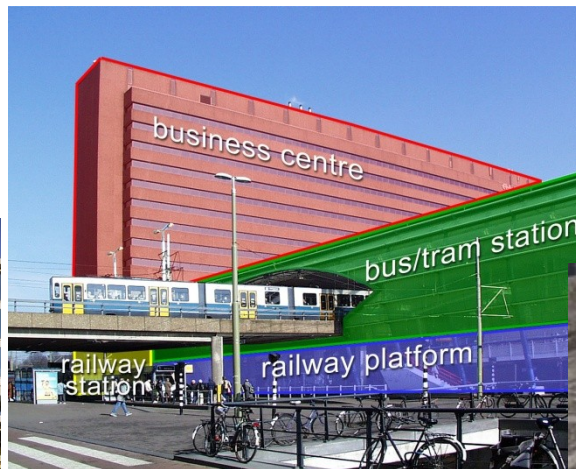
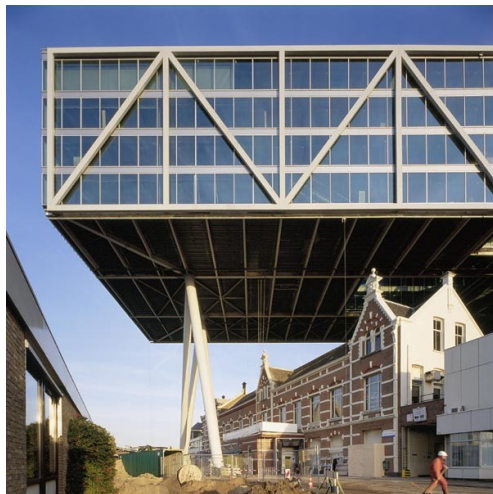
# 3D Cadastres in Europe and The Netherlands

Jantien Stoter, Martin Salzmann  
Cadastre, Land Registry and Mapping  
Agency

*kadaster*  
feitelijk verrassend

# 3D-cadastrres

- Complex spatial situations (special)
- Condominiums/Apartments (common)
- Cables and pipelines (special -> common)



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# Developments and state of play

- Increasing complexity in land (space) use
- Resulting complexity in land (space) rights
- No country with true 3D Cadastre
- Partial solutions:
  - 3D in public register (not in map)
  - specific object types (buildings, constructions)

# Questionnaire status of 3D cadastre world-wide

## FIG working group on 3D-cadastres



- Questionnaire starts with definition of 3D parcel:  
*‘spatial unit against which (one or more) unique and homogeneous rights (e.g. ownership right or land use right), responsibilities or restrictions are associated’*
- Important distinction between 3D physical and 3D legal object

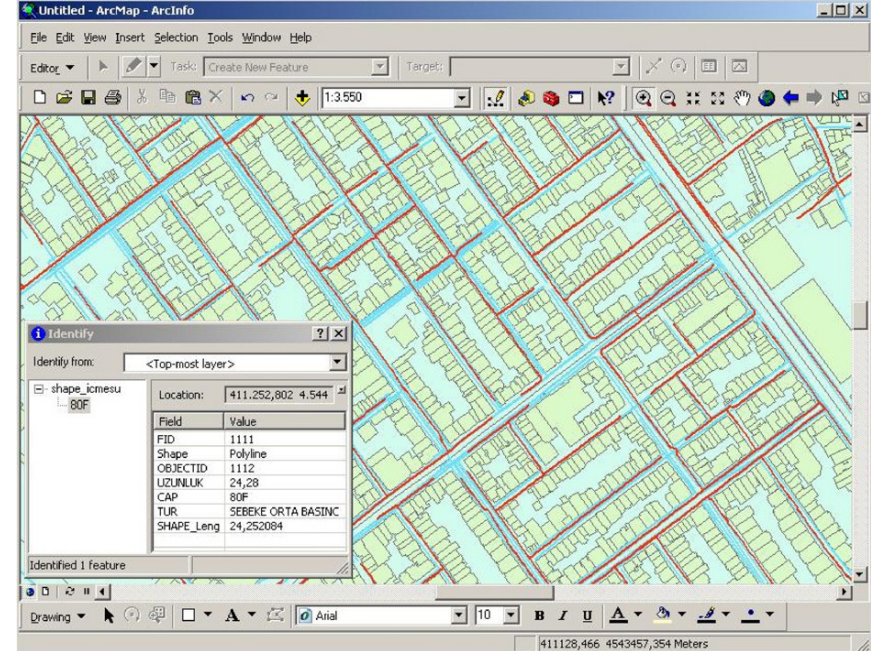
# Global analysis of responses

- 36 FIG completed questionnaires received (19 European)
- Nearly all jurisdictions allow registration of 3D parcels, in practice often (limited to) apartments
- Despite efforts to harmonise, concept '3D cadastre/parcel' still ambiguous
- Completed questionnaires give overview of the different systems: organizational, legal, technical

# Some observations

- 3D parcels in most cases within surface parcel
- Sometimes parcel under/above surface parcels
- Most countries have no explicit rules if 3D rights are connected to (empty) spaces or physical objects
- Some countries require construction (Sweden, Norway)
- Boundaries often refer to physical elements of buildings or constructions
- Absolute (e.g. France) and relative heights are in use
- No registration in any cadastral database
- Floorplans often in land register

# Cables and pipelines



- Specific type of 3D object: below/above several land parcels
- Sometimes registration of right spaces related to networks (Netherlands, Switzerland)
- Some countries have separate 'utility' maps (Croatia)

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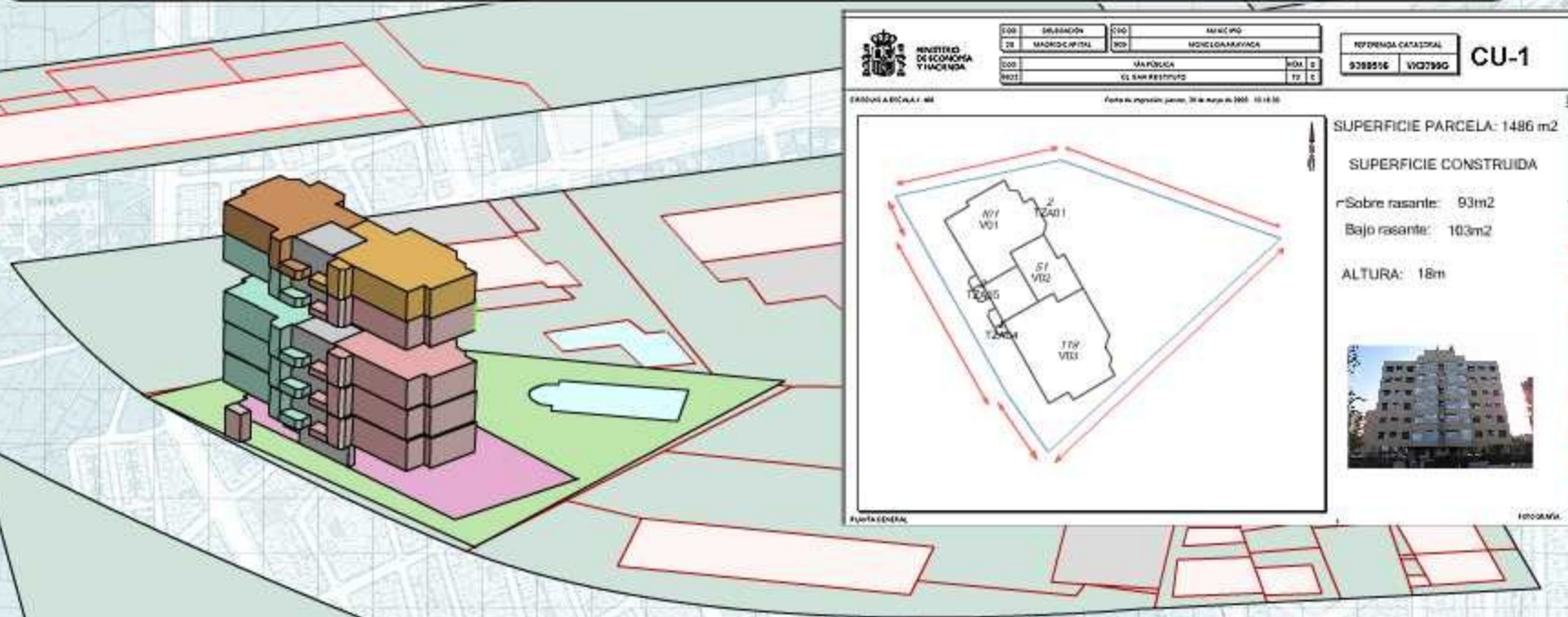
MINISTERIO  
DE ECONOMÍA  
Y HACIENDA

SECRETARÍA DE ESTADO  
DE HACIENDA  
Y PRESUPUESTOS

DIRECCIÓN GENERAL  
DEL CATASTRO

# El e-catastro 4D actualizado diariamente

Localización, Altura de edificios, croquis por planta, Datos catastrales, fotografías de fachada.  
*Real state location, buildings height, floor sketches (CU1), Cadastral data, front photographs.*



Toda esta información permite el estudio de la realidad territorial incorporando el volumen de las edificaciones, obtenida directamente de la cartografía

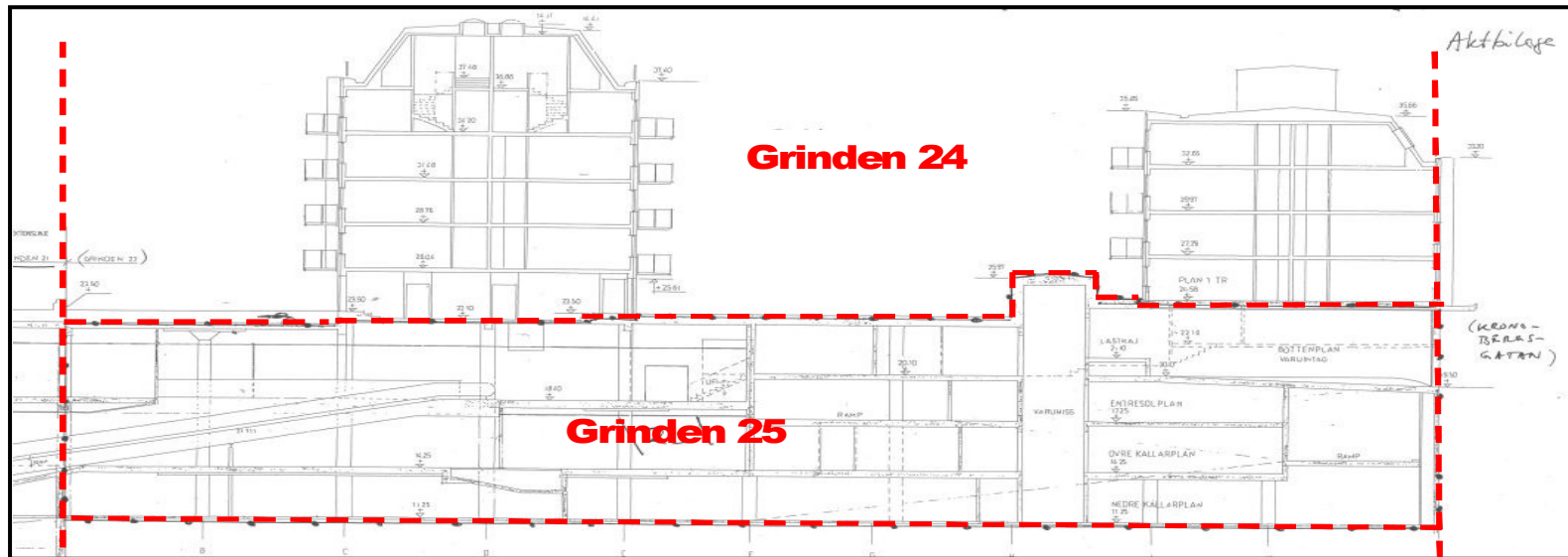
*All this information allows territorial studies. Buildings are also incorporated, directly taken out directly from the cartography.*

# Sweden

- “3D-property” introduced in 2004
- Main aim: division in ownership between apartments and shops (streetlevel).
- Can also be used for bridges, tunnels, etc
- Property unit must be related to building or construction
- Cadastral procedure to form 3D property units
- Boundaries may defined by physical elements or coordinates

# Sweden

## — Kv Grinden, Stockholm —



LANTMÄTERIET

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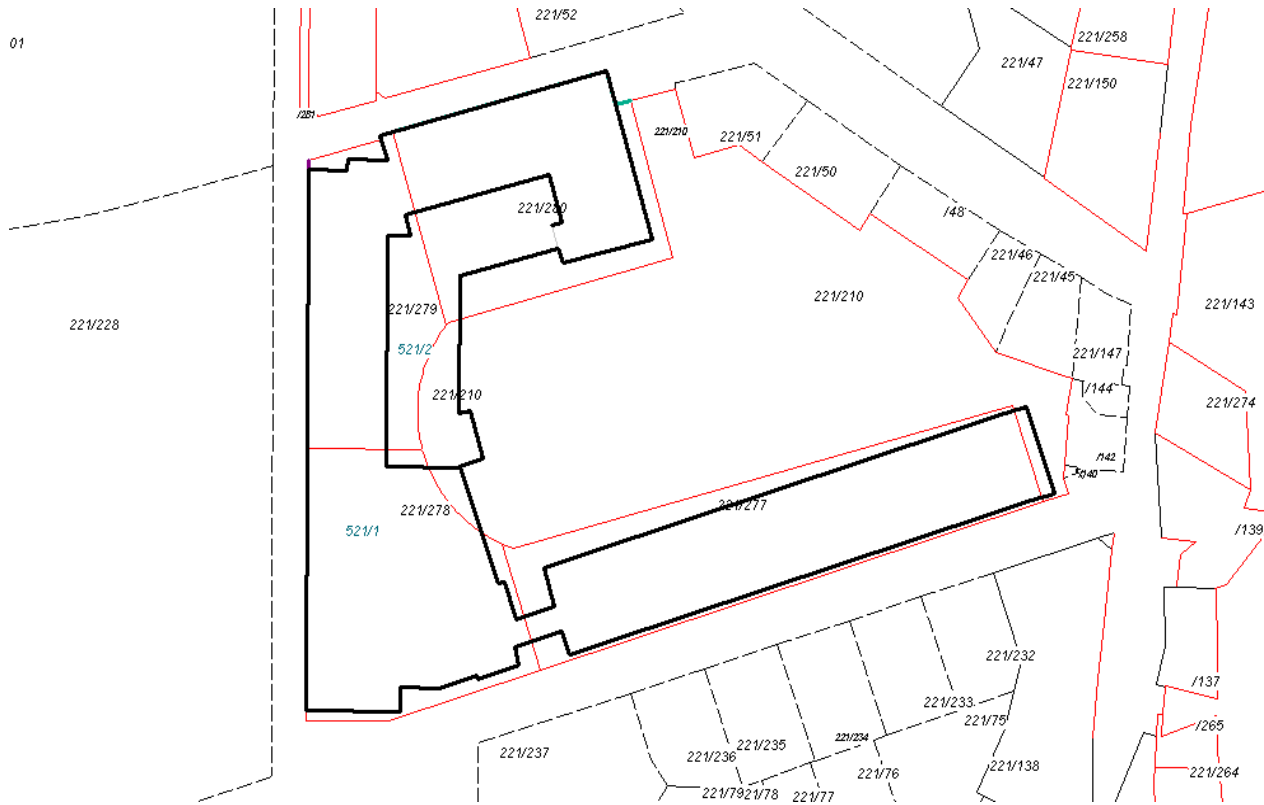
# Norway

- A new Law on the Cadastre (2010) makes “construction parcels” possible
- 3D parcels that can be established both under and above the surface parcel and in multiple layers
- The 3D parcel is registered as a separate property
- Property unit must be related to construction (permit)
- The cadastral map shows only the projection of the 3D property on the surface.
- To get 3D information the survey must be consulted. A construction drawing is sufficient.

# Norway: apartment complex and underground parking garage



# Norway Case

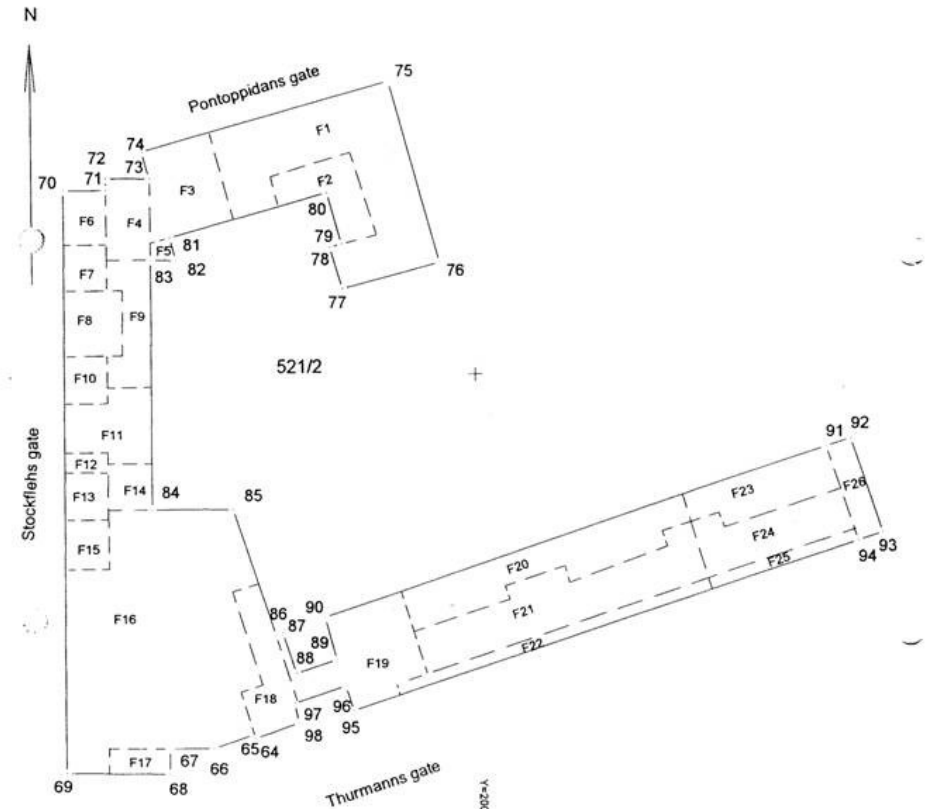


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# Norway Case

Øvr	521	Øvr	1	Festare	
Representasjonspunkt	X 2560	Y 1929	Z 64		
Kartblad	NOC5-2		Landemått	X	Lokal system
Målestokk	1:1000	Areall	7524.9	M <sup>2</sup>	

MÅLEBREVKART	
Jnr	980003996
Målebrev nr	1998/385



ØVRE HØYDER (ØH)					
F1	ØH +68,94	F14	ØH +65,05		
F2	ØH +68,60	F15	ØH +64,85		
F3	ØH +67,80	F16	ØH +64,23		
F4	ØH +68,23	F17	ØH +64,10		
F5	ØH +67,84	F18	ØH +68,23		
F6	ØH +67,63	F19	ØH +65,59		
F7	ØH +67,33	F20	ØH +65,14		
F8	ØH +67,00	F21	ØH +65,61		
F9	ØH +67,84	F22	ØH +65,16		
F10	ØH +66,43	F23	ØH +68,29		
F11	ØH +65,53	F24	ØH +68,75		
F12	ØH +65,29	F25	ØH +68,30		
F13	ØH +65,02	F26	ØH +68,03		

NEDRE HØYDE ER +61.70

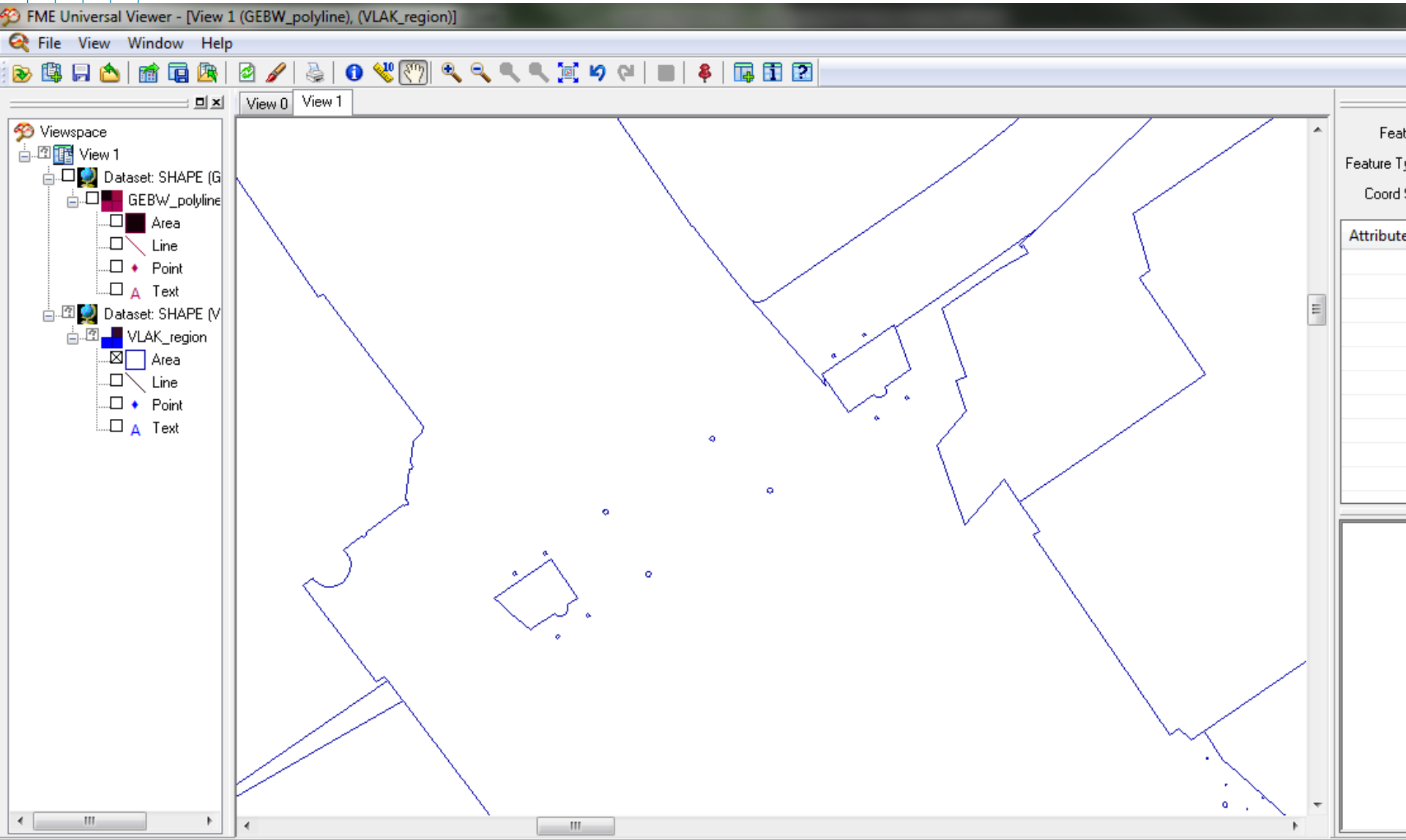
# Current legal framework in the Netherlands

- Rights to establish multi-level property:
  - right of superficies
  - condominium rights (or right to an apartment)
  - easement rights (which also can be used to guarantee line of sights)
  - right of long lease.

# The Netherlands

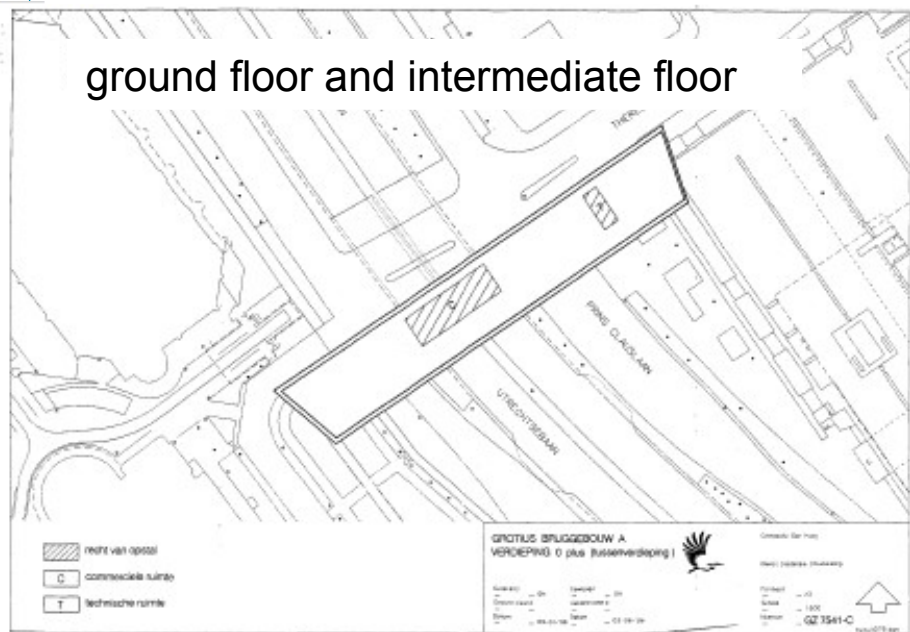


# Cadastral map

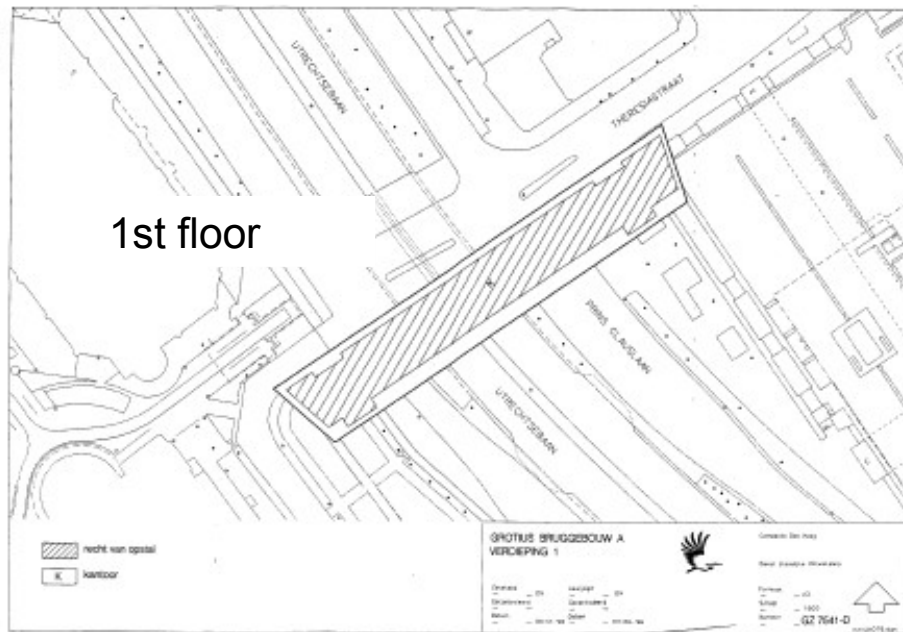


# 3D Description (right of superficies) in the deed

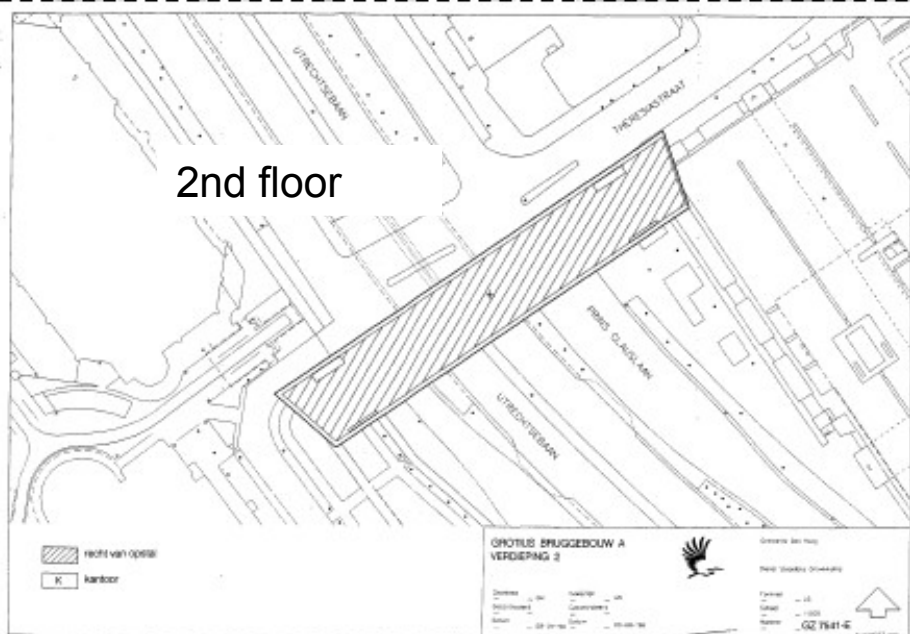
ground floor and intermediate floor



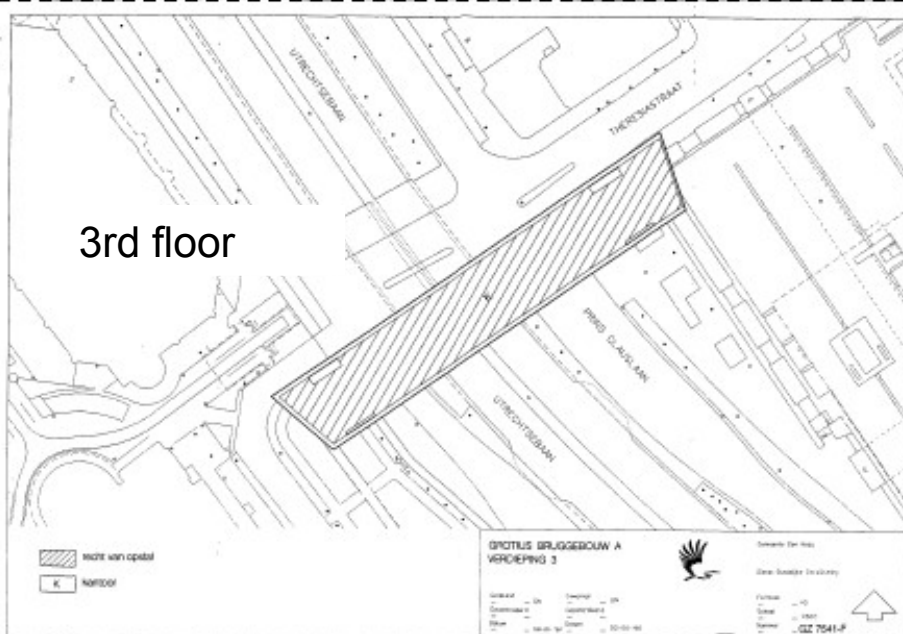
1st floor



2nd floor



3rd floor



# Conclusions The Netherlands

- 2D parcel is entry point of registration
- 3D information in cadastre is limited
- Mental exercise (puzzle of separate drawings) to understand the real situation
- “Ineffective parcel formation”; one object is divided over (many) parcels

# Towards 3D registration (1/3)

- how can 3D situations be better registered and portrayed within current legal framework
- Current legal framework is starting point because:
  - Change of law is lengthy process
  - To avoid unnecessary resistance

## Towards 3D registration (2/3)

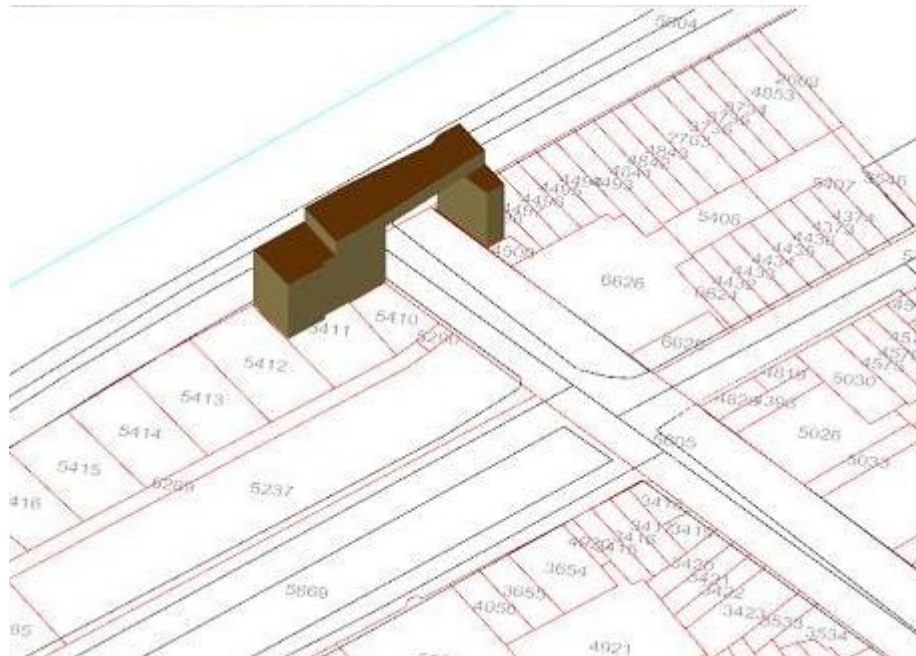
- Currently: in consultation with the notary if a land registrar should refuse a registration of very small parcels due to projecting of 3D situations for sake of “effective parcel formation”.
- land registrar should be able to require 3D representation in some situations
- For condominiums it would mean an extension on the guidelines for apartments.

# Towards 3D registration (3/3)

- Guidelines are being set up:
  - To identify situations for which a 3D approach is recommended
  - How 3D information should be offered for registration

# Further research

- Further research should identify situations which require a 3D approach as well as exact requirements for the 3D representations. Currently only a 3D PDF is mentioned, which provides the user 3D interaction functionalities.



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