



DIGITAL TRANSFORMATION FOR RESPONSIBLE LAND ADMINISTRATION

FIG Commission 7 & 2 Annual Meeting 2023

2-4 October 2023, Deventer



Organized by

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Bronze sponsors:



Experiences and Lessons Learnt

Christiaan Lemmen

FIG Commission 7 Annual Meeting

Deventer, The Netherlands, October 2nd 2023

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Gold sponsor:



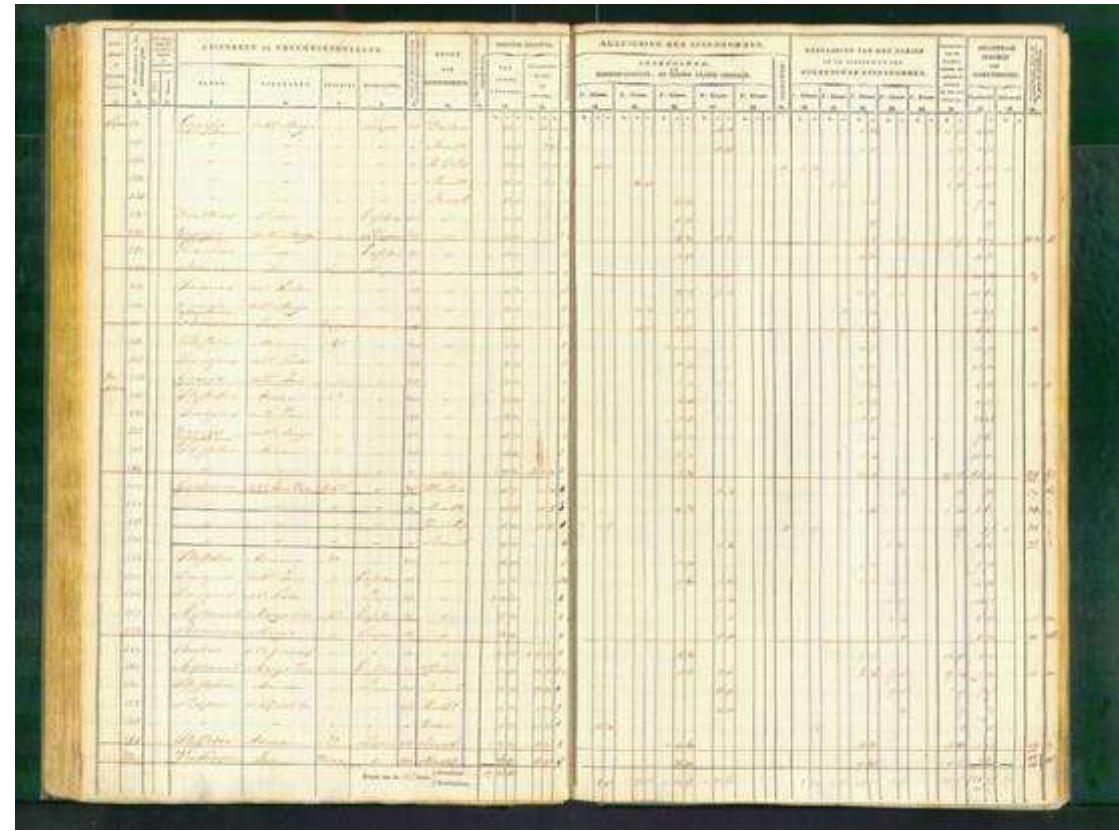
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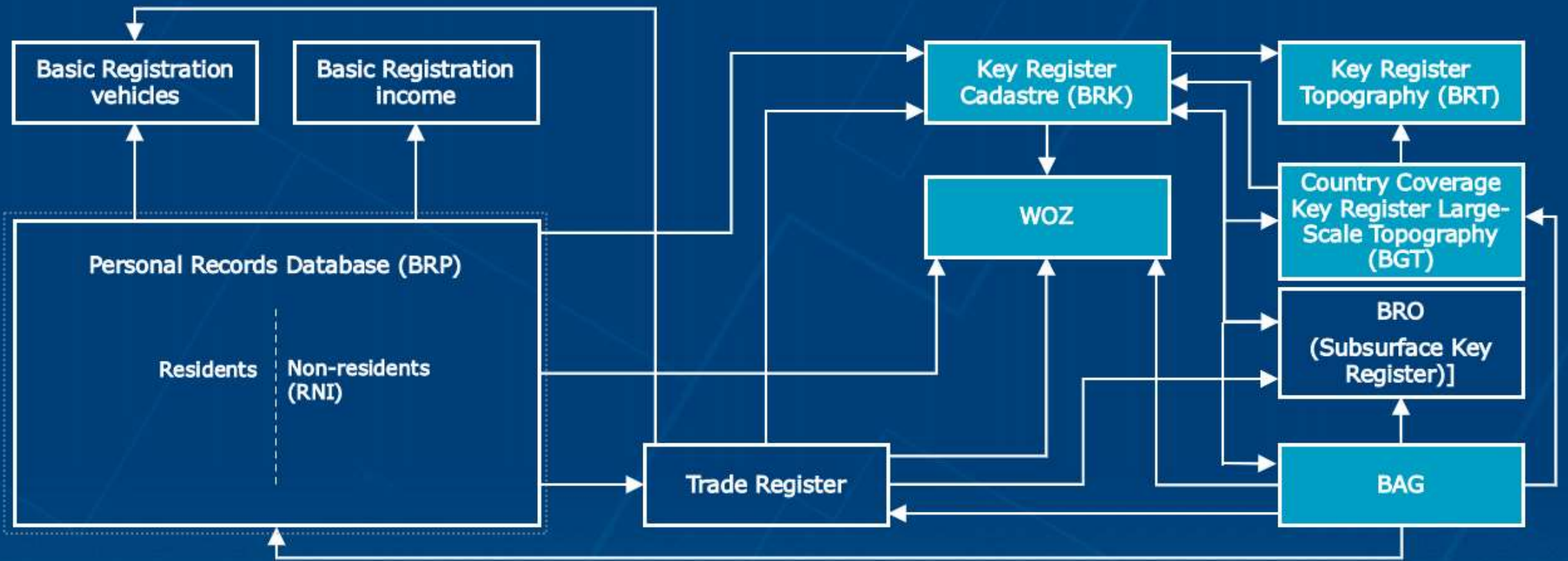
Kadaster 1832



An open cadastre register book from 1832, showing two pages of handwritten entries in a grid format. The pages are filled with columns of text, likely representing land parcels, owners, and other details. The handwriting is in a cursive script. The book is bound in the center, and the pages are slightly aged and yellowed.



key registers in the Netherlands





Relaas van bevindingen

Reconstructiebestand: Ja Metingproject: 308935
 Aantal bijlagen: 0

Gemeente
 BOXTEL

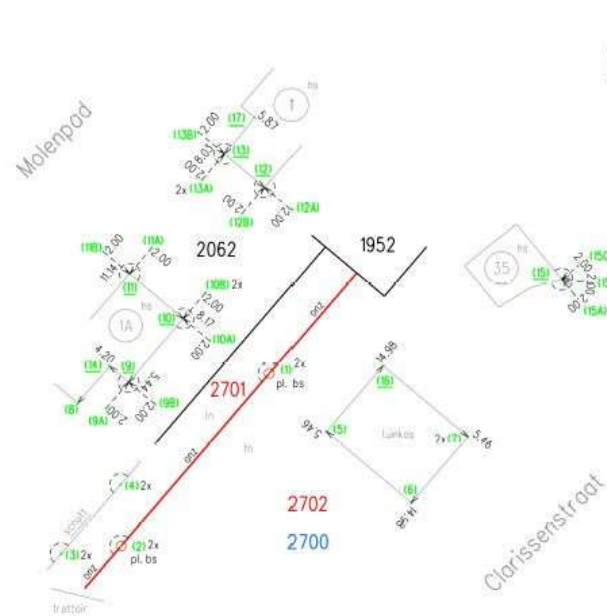
Sectie
 K

Blad
 2 van 2

Archiefnummer
 663

Opgemeten op: 01-10-2015 door
 Perceelnummers: 2701, 2702.

Meetgegevens en waarnemingen



Meting is verricht met Topcon in combinatie met gecertificeerd netwerk. Coördinaten zijn RDNAPTRANS2008.





Tenure Security

Sustainable Land Use

Protected Environment

Smart and Resilient Societies

Slum Upgrading

Peace Building and Security

Resource Management

Disaster Management

Access to Credit

Access to Basic Infrastructure

City Management

Social Justice

Taxation

Access to Housing

Environment

Traditional land rights

Wind Solar

Land rights of settled and displaced populations

Cropsharing

Communal land rights

Disputes

Nature rights

Biota

Use rights

Informal land rights

Water rights

indigenous land rights

Squatting illegally

Carbon

Customary land rights

Storage

Ownership

Common rights to grazing land

Illegal occupation

Shares in rights

Good faith

Occupancy

Overlapping Claims

Coordination and Cooperation

Map Renovation

Supervising Grassroot Surveyors and Paralegals

Transparent

Legal meaning of digital data

Using Agreed Responsibilities

Spatial Planning Act

Security

Business Model

Land Registration Act

Survey Act

Conversion Legitimate to Legal

Protection of Privacy

Maintenance

Personal Liability

Ethical Principles

Legal Disclaimer

Access Control

Introduction of Digid

Location of the Datasets

E-Conveyancing

Conversion Deed to Title

Recognition of Land Rights

Dispute Mapping

Protecting Copyright



FIG GUIDE

Fit-For-Purpose Land Administration



JOINT FIG / WORLD BANK PUBLICATION



INTERNATIONAL
STANDARD

ISO
19152

First edition
2012-12-01

Geographic information — Land Administration Domain Model (LADM)

Information géographique — Modèle du domaine de l'administration
des terres (LADM)



Reference number
ISO 19152:2012(E)

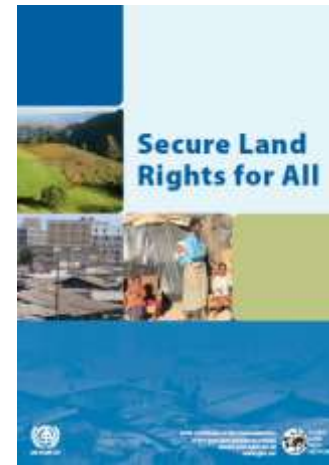
© ISO 2012



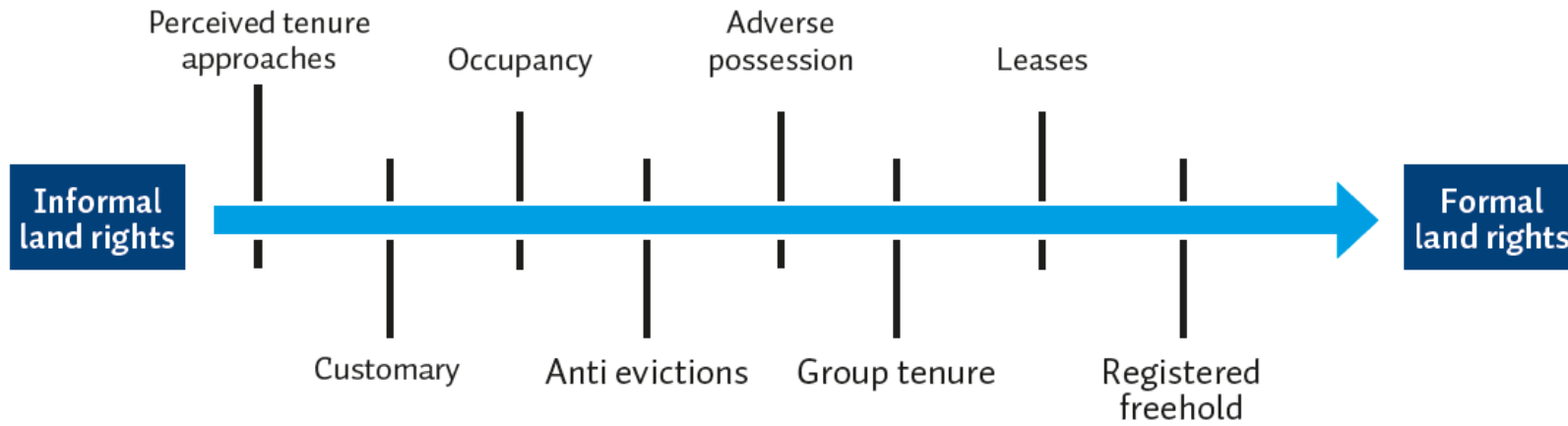
FIG REPORT

The Social Tenure Domain Model A Pro-Poor Land Tool

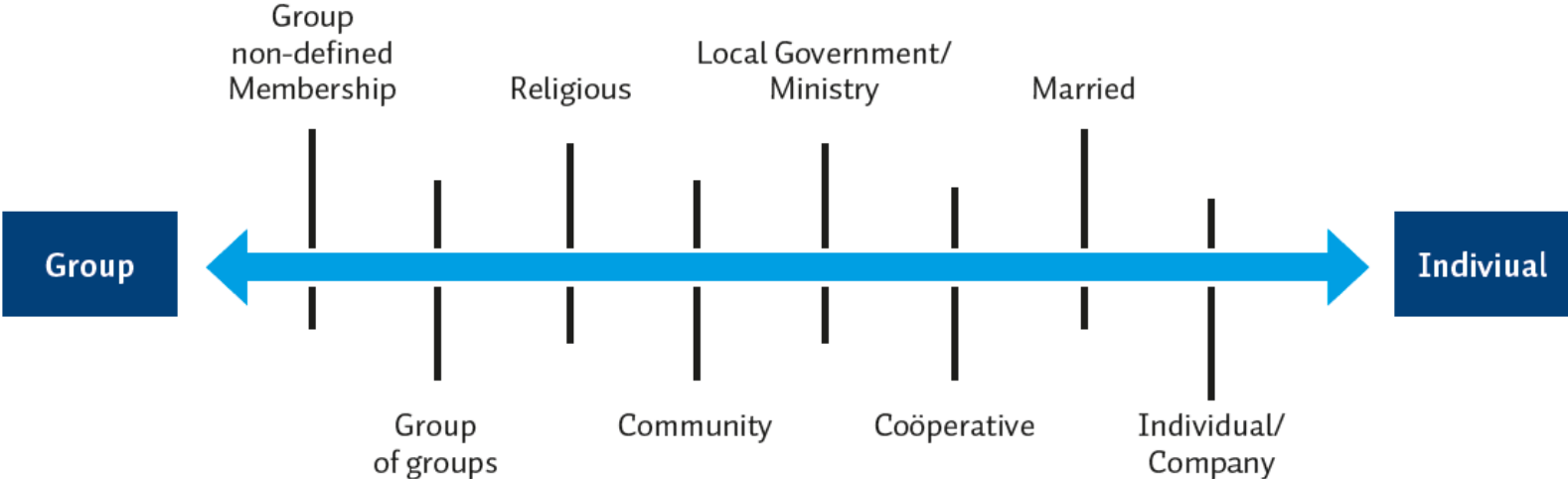




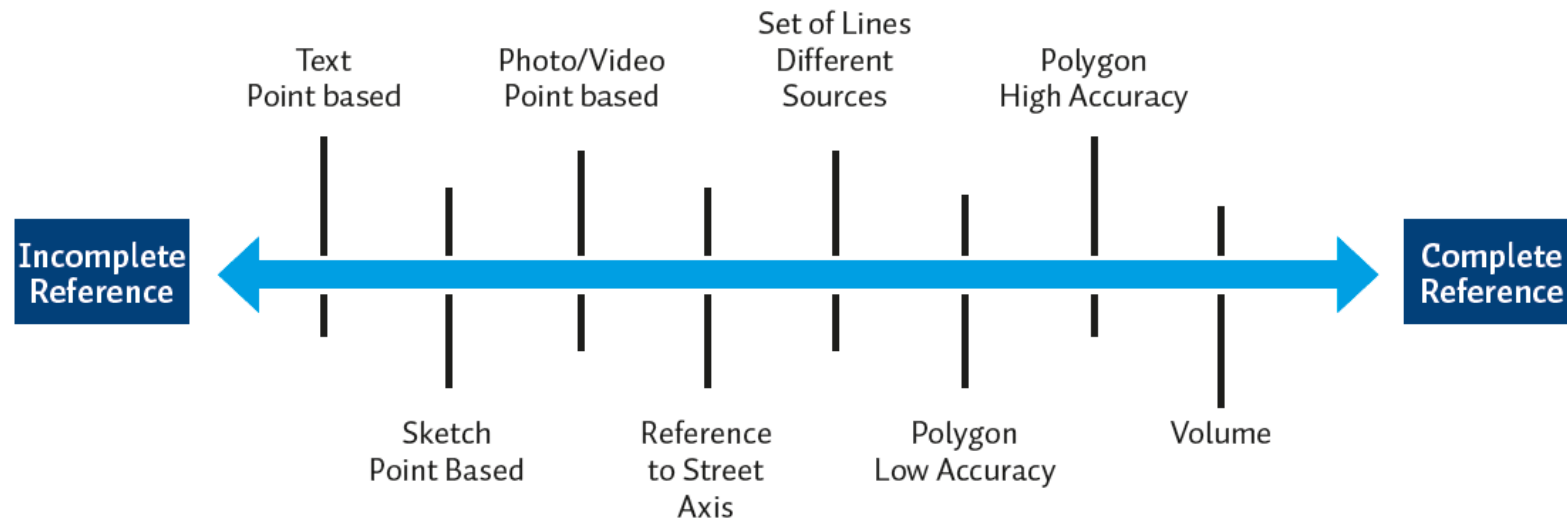
Continuum of land rights



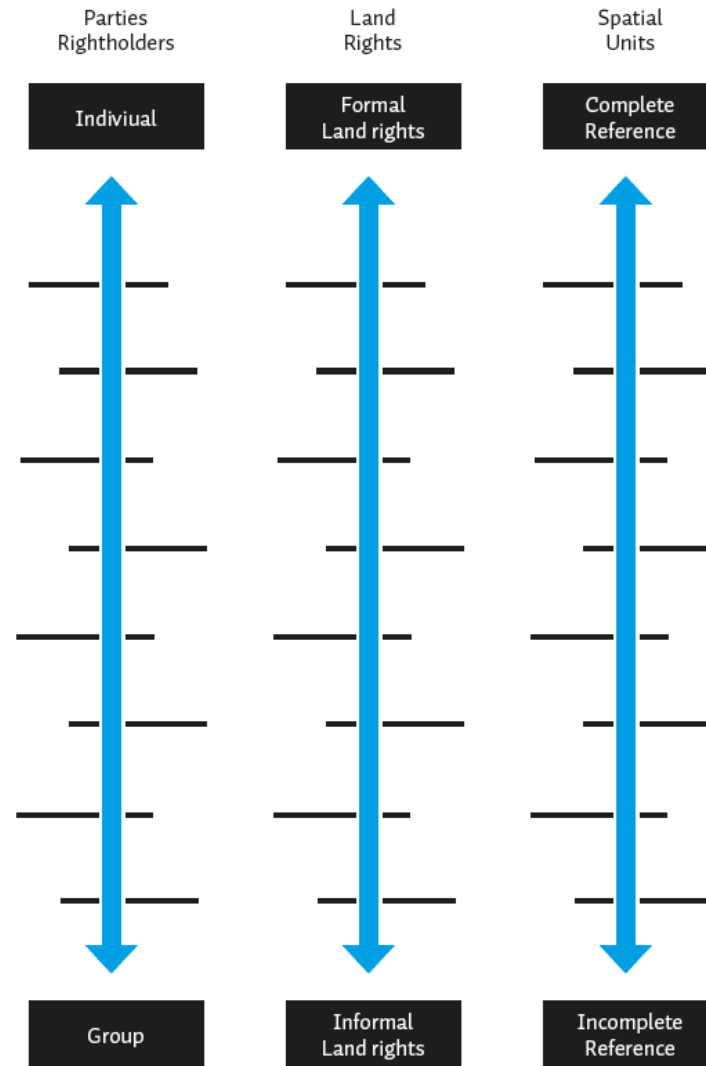
Continuum of rightholders



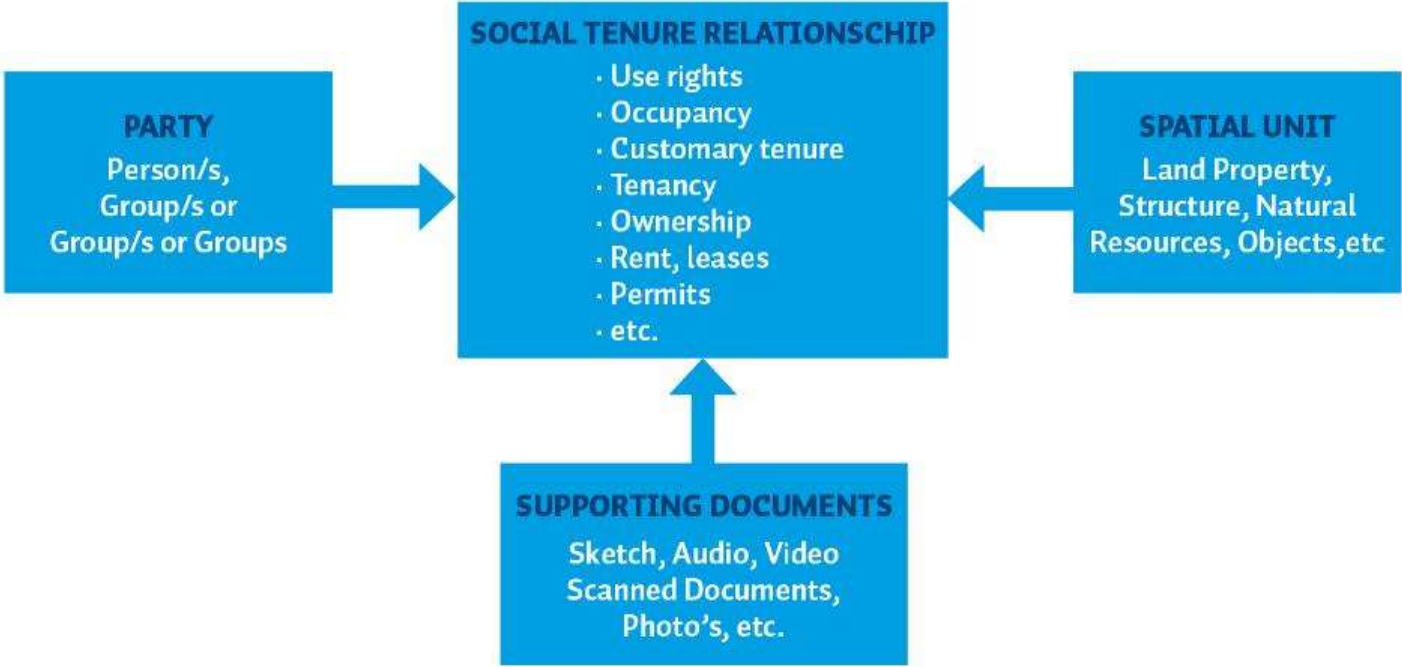
Representations of spatial units



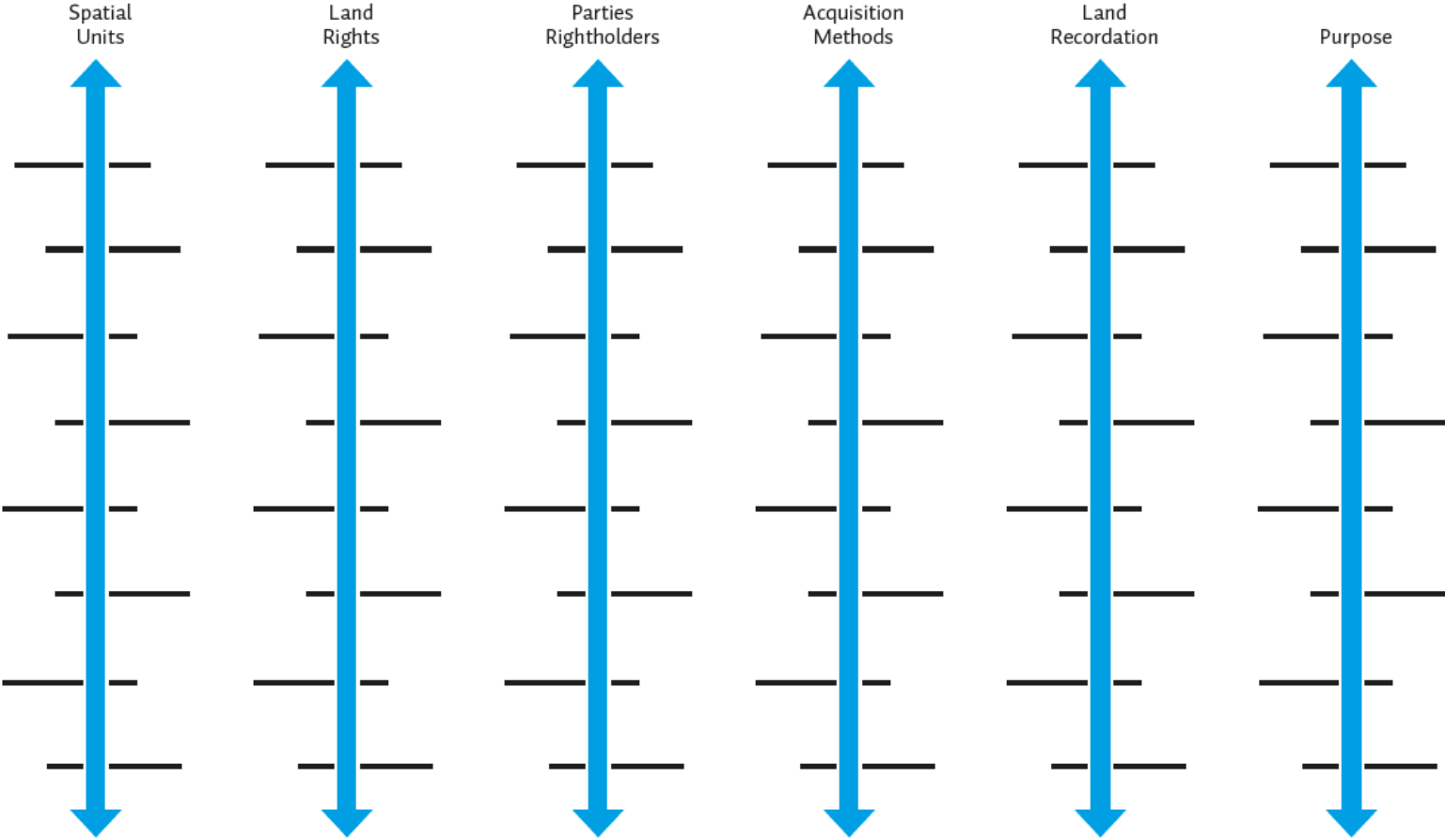
STDM



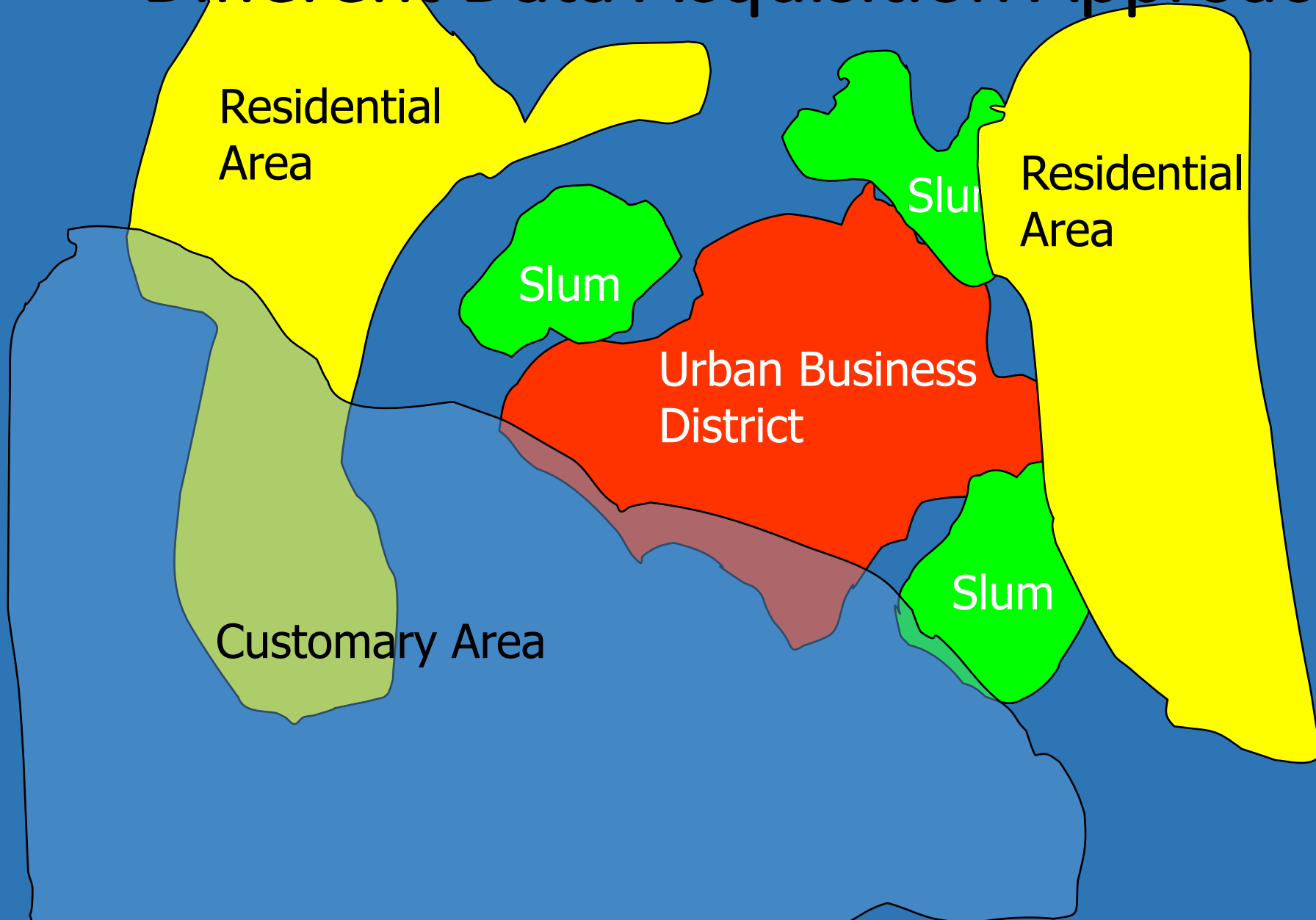
STDM Conceptual Model



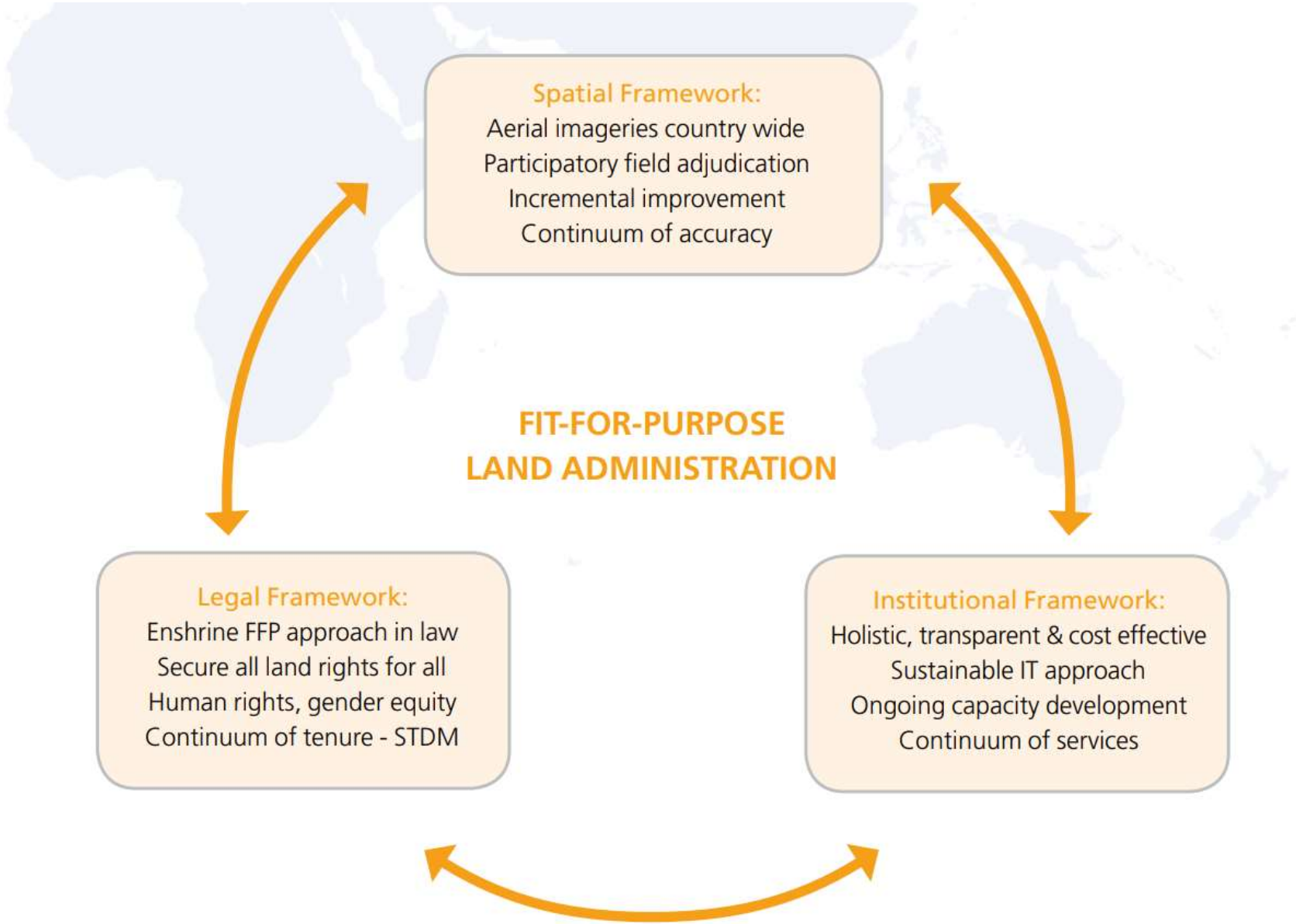
Equalizer



Different Data Acquisition Approaches

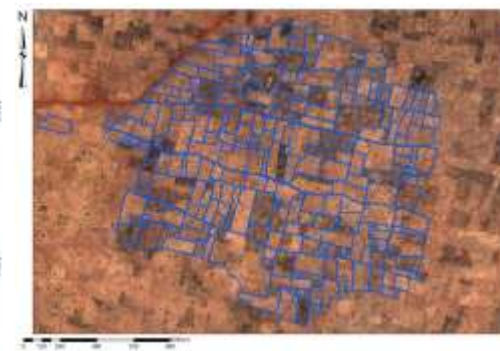
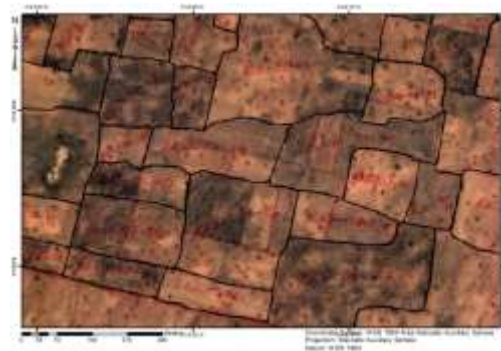


FIT-FOR-PURPOSE LAND ADMINISTRATION

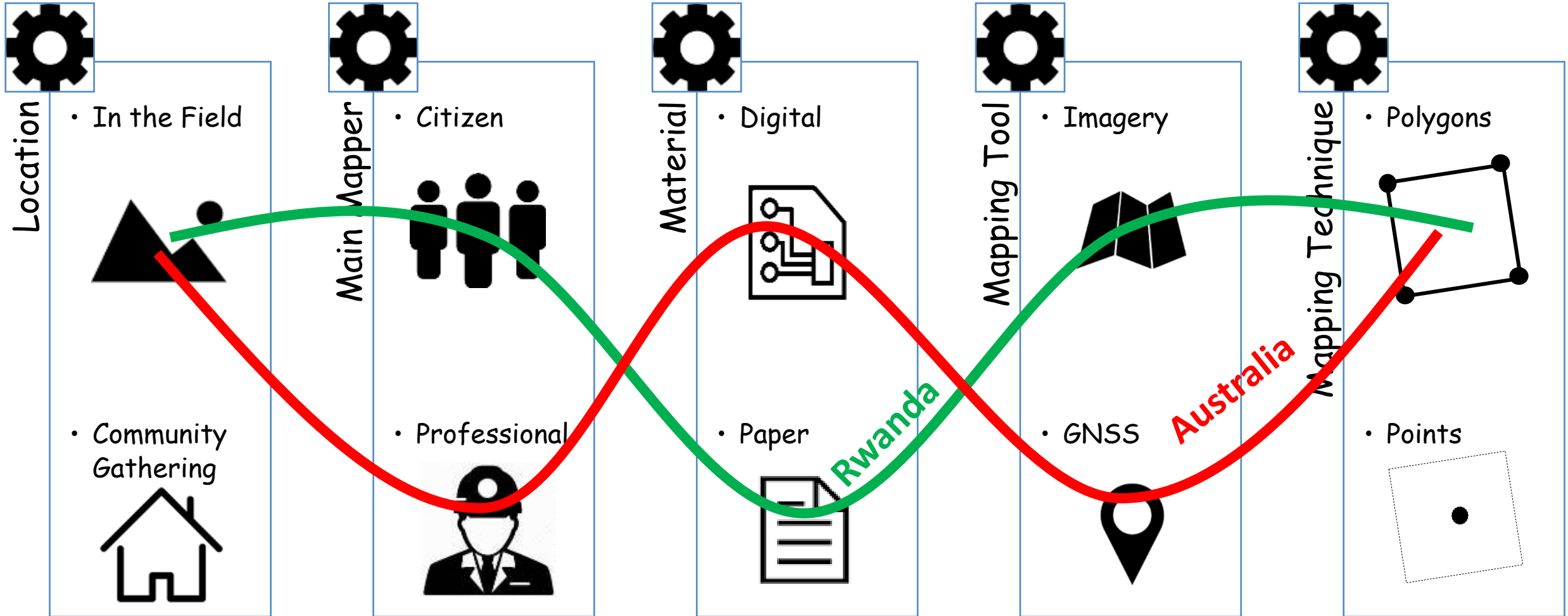








Mapping Options



Fit-For-Purpose Land Administration

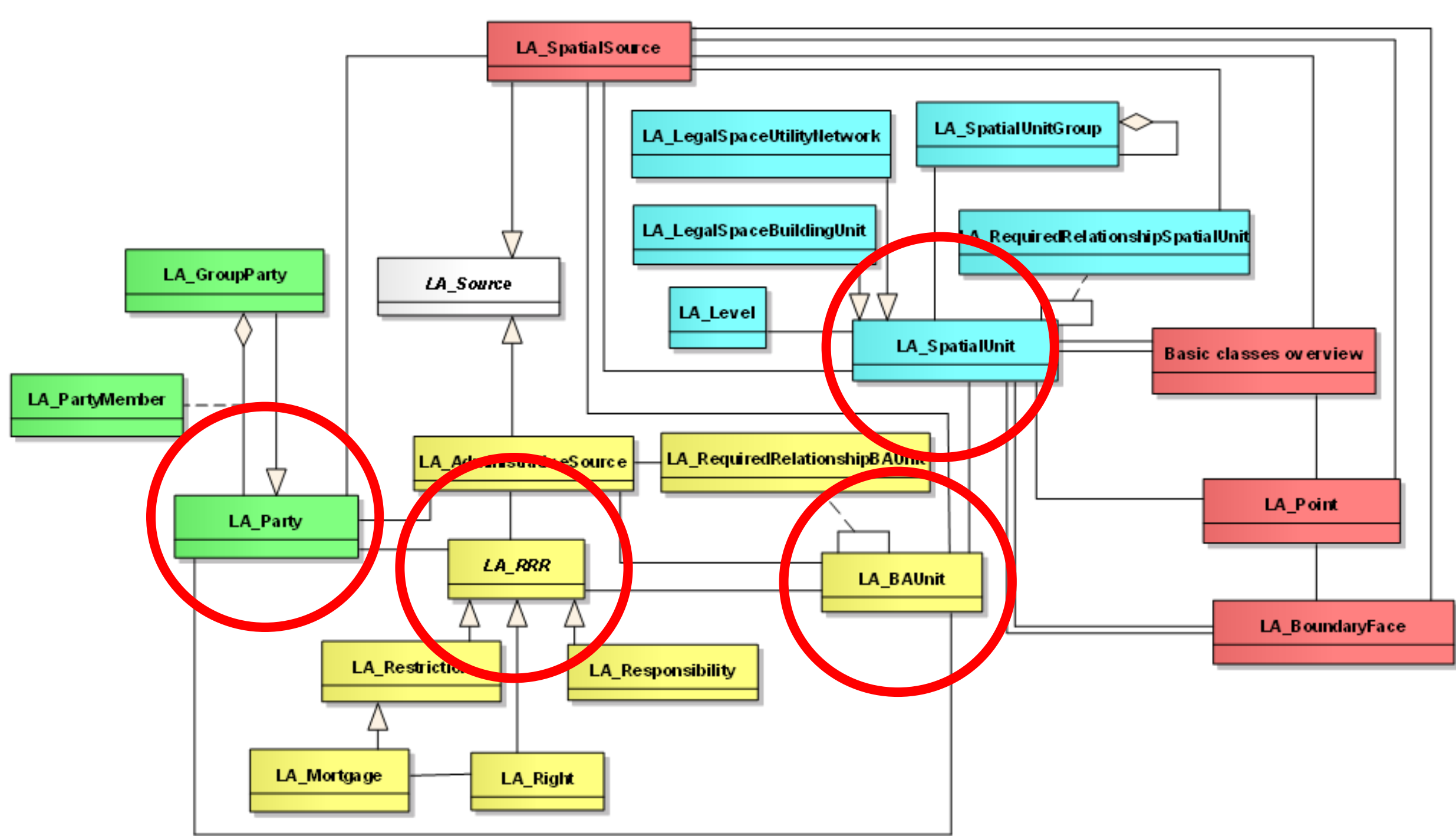
Spatial Data Acquisition

Main Mapper	Location	Approach	Mapping Tool	Spatial Units	Level of Accuracy	Demarcation
Grassroot / Paralegal Surveyor	In the field	Paper-based	Total Station	Centroid Point	Centimeter	Survey Mark
Crowdsourced/ Volunteered	In the village	Digital	GNSS Antenna (absolute)	Lines	Decimeter	Other Demarcation
Government Surveyor			GNSS Antenna (relative)	Polygon		
Private Surveyor	In the office	Mixed	RTK	Reference to street axis	1-5 Meter	No Demarcation
			Aerial Imagery / UAV	Volume		
Registrar			HRSI	Sketch/Topology based	5-10 Meter	Visible/ Topographical Boundaries
			AFE	Text/Video based		
			Mobile Device			
			Tape/Chain/ Plain Table			

Social/Administrative Data Acquisition

Data Collector	Location	Approach	Validation	Storage	Distribution
Grassroot / Paralegal Surveyor	In the field	Paper-based	Public Inspection in the office	Cloud	Web Services
Crowdsourced/ Volunteered	In the village	Digital	Public Inspection in the field	Server Database	Webshop
Government Surveyor				Local Database	Machines
Private Surveyor	In the office	Mixed	Remote	Analogue Archive	Local Office Desk
Registrar					

Data Management



LADM Country Profiles

Bénin	Israel	Saudi Arabia
Brazil	Japan	Scotland
Cape Verde	Kenya	Serbia
China	Malaysia	Singapore
Colombia	Mongolia	Slovenia
Croatia	Montenegro	South Africa
Cyprus	Morocco	South Korea
Czech Republic	Mozambique	The Netherlands
Ethiopia	Nigeria	Trinidad and Tobago
Greece	Poland	Turkey
Honduras	Portugal	Uganda
Hungary	Queensland, Australia	Victoria, Australia
India	Republic of Srpska	Vietnam
Indonesia	Russian Federation	

LADM v2 will become multi-part

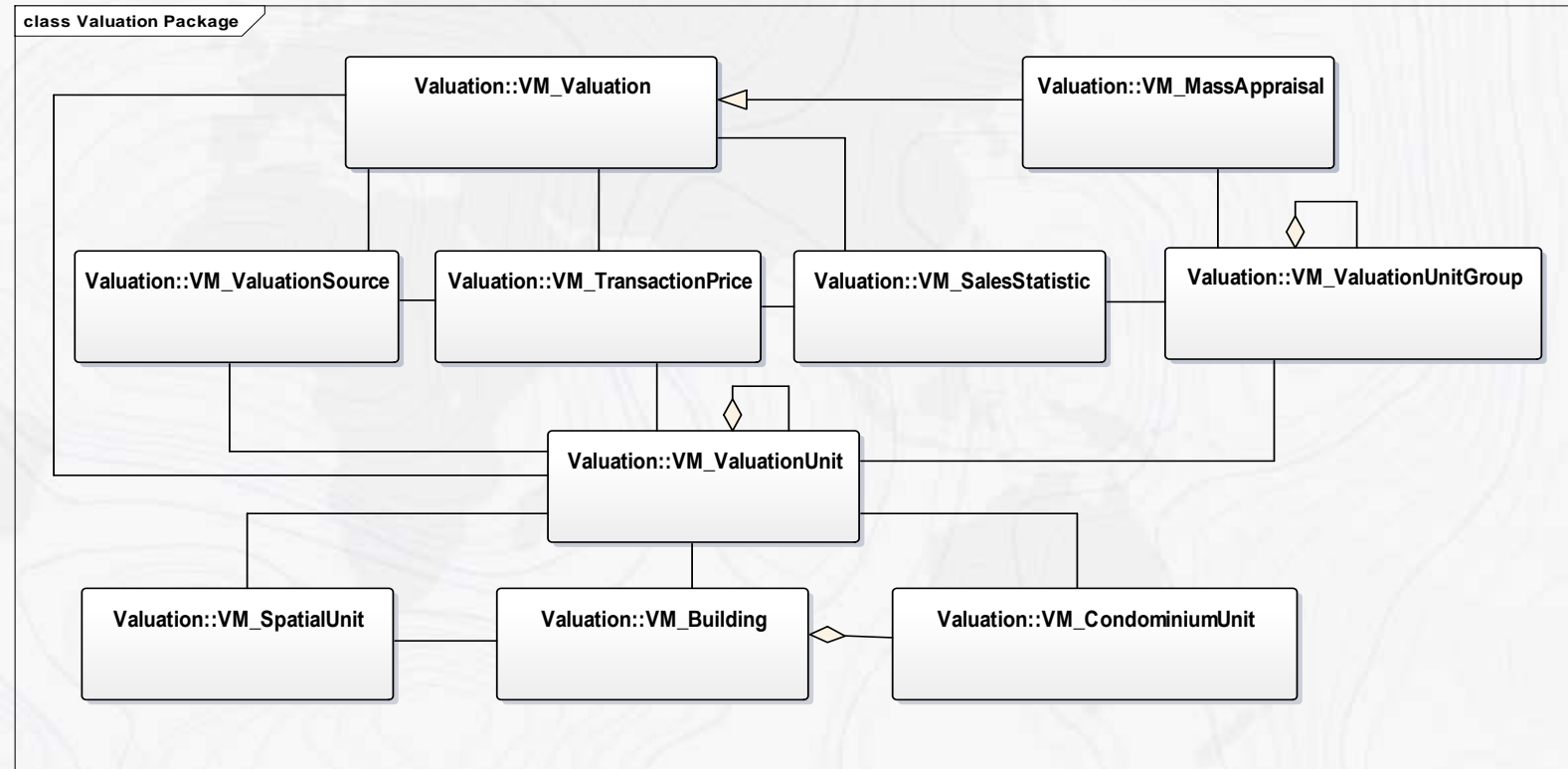
- Part 1 – Generic conceptual model
- Part 2 – Land registration
- Part 3 – Marine georegulation
- Part 4 – Valuation information
- Part 5 – Spatial plan information
- Part 6 – Implementation aspects



Scope current version
LADM 2012

ISO 19152 LADM – Part 4: Valuation information

- Representing all stages of administrative property valuations (input and output data in valuation processes).
- Basic components of property valuation systems (e.g., transaction prices, sales statistics, valuation units).

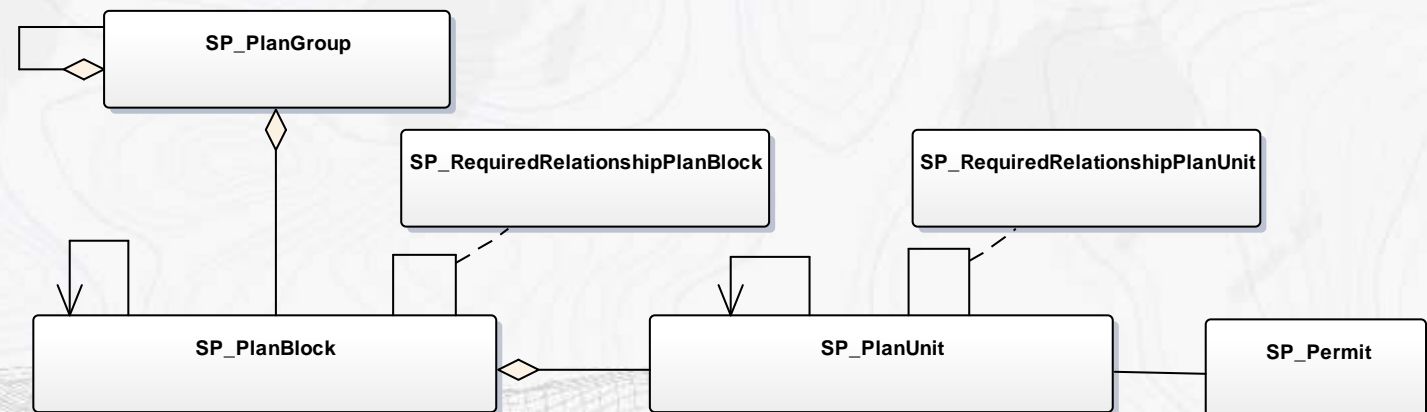


ISO 19152 LADM – Part 5: Spatial plan information

- Integrating Rights, Restrictions, and Responsibilities (RRRs) from spatial plans, as an additional package, into LADM.
- A general reference model, as an extension of core LADM (ISO 19152-1 and 19152-2), for all objects of spatial planning those covering land/water and below/on/above surfaces.

- Four basic classes:

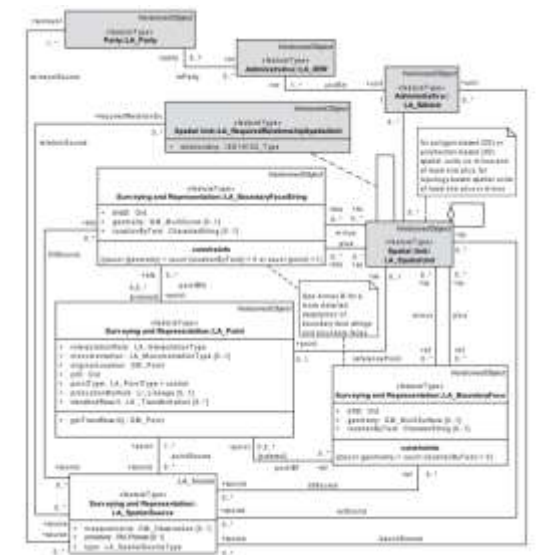
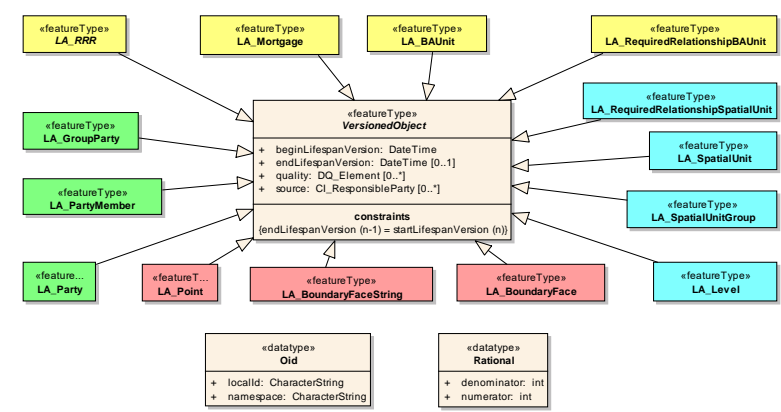
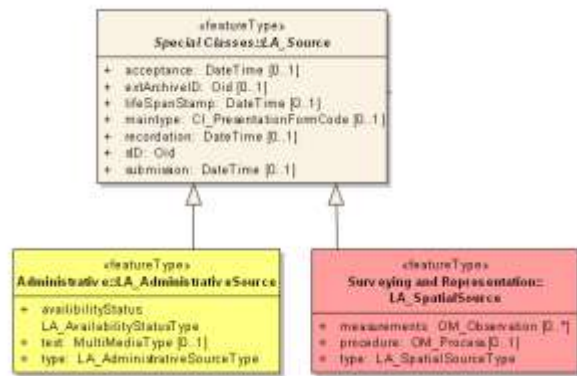
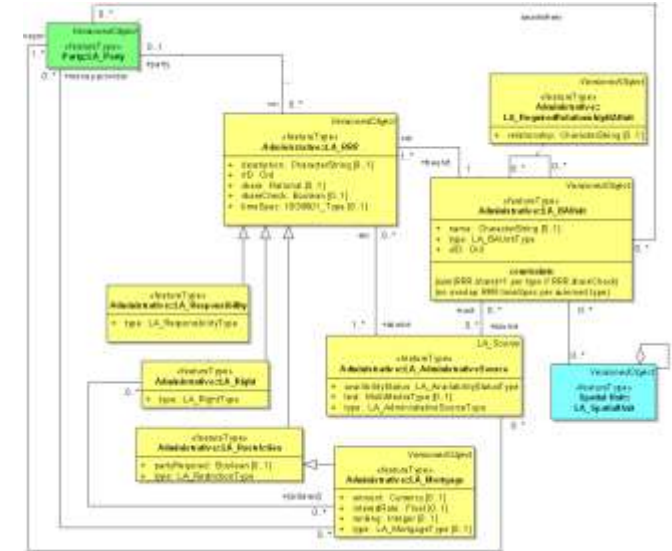
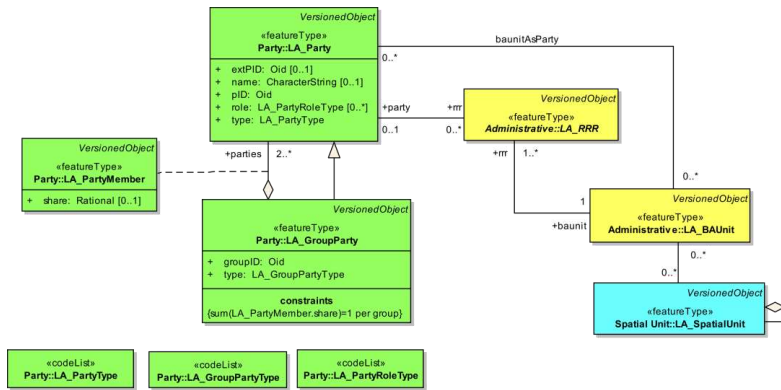
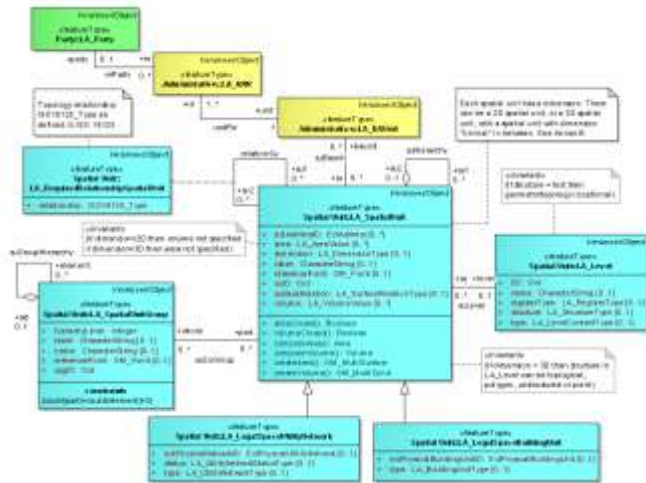
- plan unit
- plan group,
- plan block and
- permit

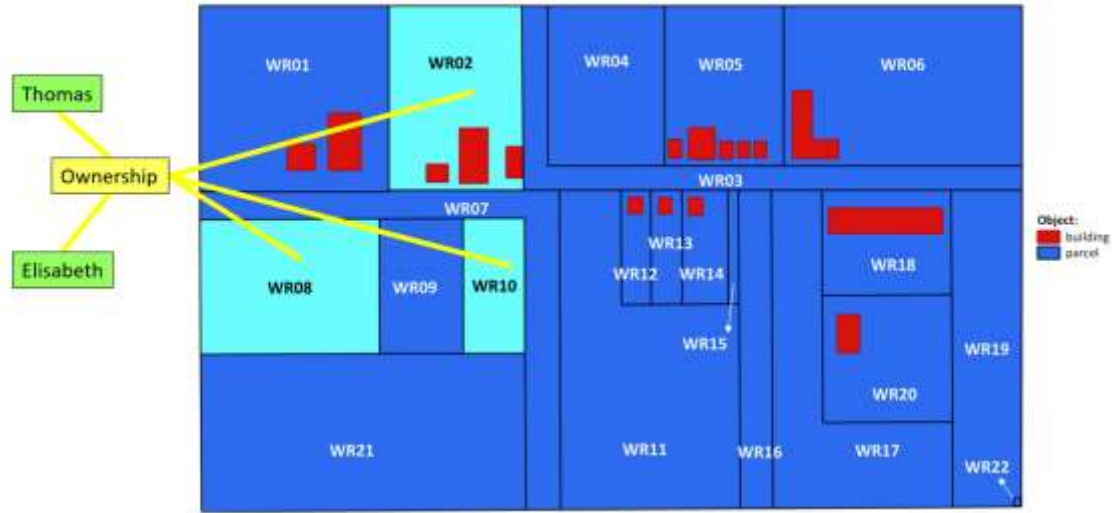


A world map in shades of blue, centered on the Atlantic Ocean, with a grid of latitude and longitude lines. The text is overlaid on the map.

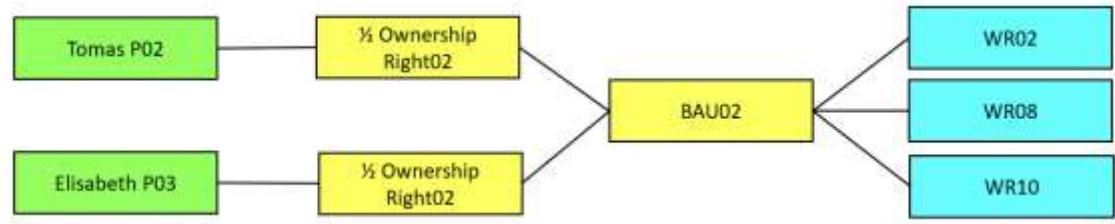
Need for educational materials
Online
Easy accessible
SLAS

Normally we start from the model...

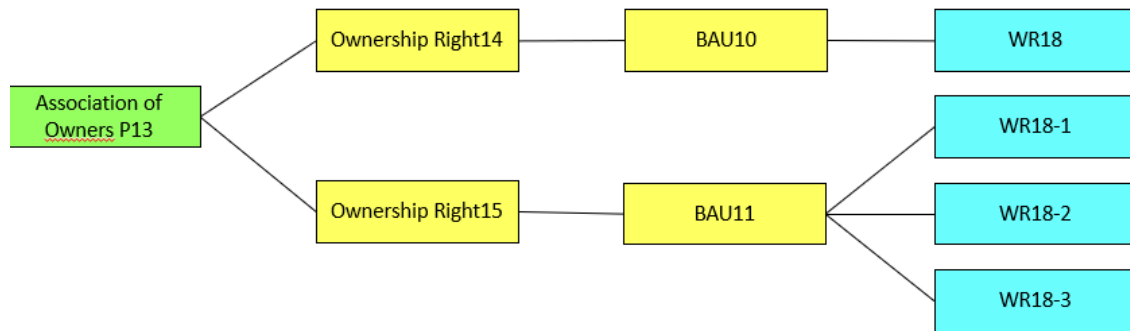
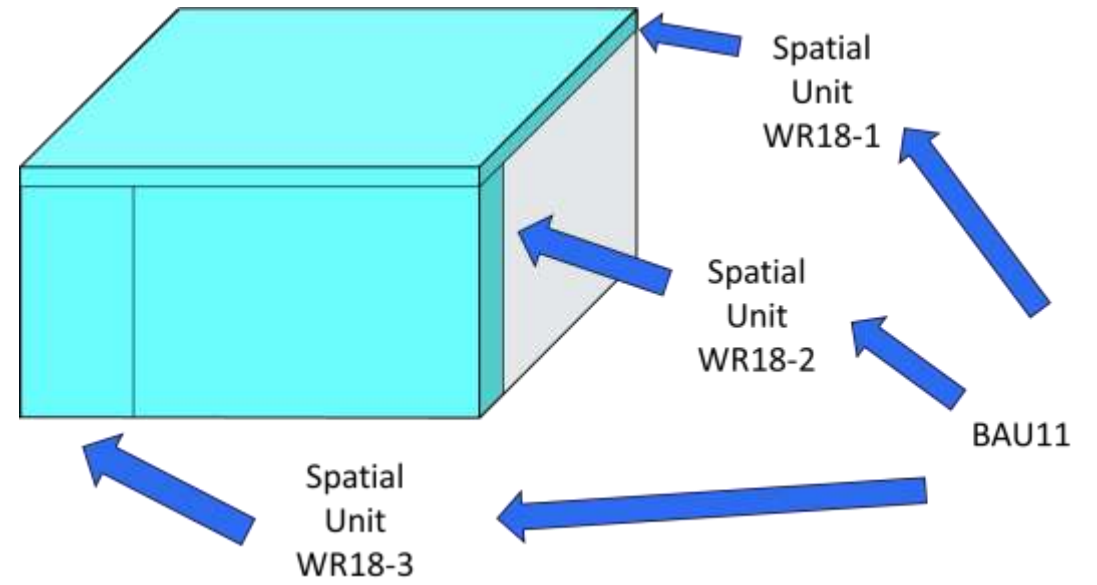
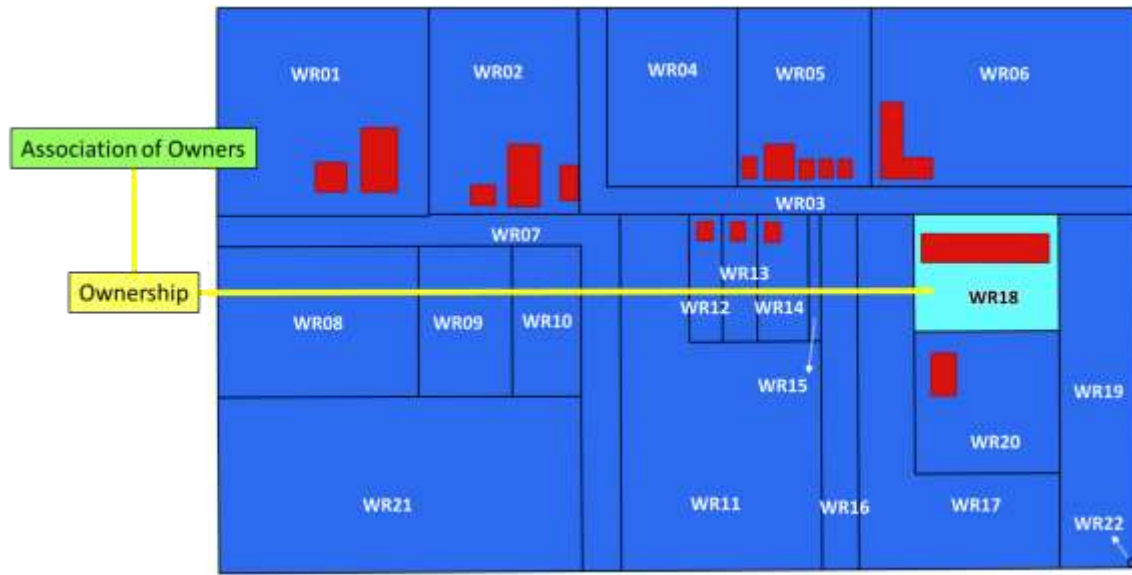




p_id	name	r_id	type	share	bau_id	su_id	area	geom	...
1	P01	1	Right01	Ownership		1	WR01		
2	P02	2	Right02	Ownership	1/2	2	WR02		
3	P03	3	Right02	Ownership	1/2	2	WR02		
4		4							
5		5							
6		6							
7		7							
8		8				8	WR08		
9		9							
10		10				10	WR10		
11		11							
12		12							
13		13							
14		14							
15		15							
16		16							



Shares in rights?
 As percentages?
 BAUnit needed?



p_id	name
1	P01 Carlos
2	P02 Thomas
3	P03 Elisabeth
4	P04 Municipality
5	P05 Anna
6	P06 Cooperation
7	P07 Capital Bank
8	P08 Housing Company
9	P09 Maria
10	P10 Johan
11	P11 Anton
12	P12 James
13	P13 Association of Owners
14	
15	
16	

r_id	type	share
4	Right03	Ownership
5	Right04	Ownership 9/10
6	Right04	Ownership 1/10
7	Right05	Ownership
8	Right06	Ownership
9	Right07	Usufruct
10	Right08	Ownership
11	Right09	Ownership
12	Right10	Ownership
13	Right11	Leasehold 1/2
14	Right11	Leasehold 1/2
15	Right12	Leasehold
16	Right13	Leasehold
17	Right14	Ownership
18	Right15	Ownership

bauid	
1	BAU01
2	BAU02
3	BAU03
4	BAU04
5	BAU05
6	BAU06
7	BAU07
8	BAU08
9	BAU09
10	BAU10
11	BAU11
12	
13	
14	
15	
16	

su_id	area	geom	...
5	WR05		
6	WR06		
7	WR07		
8	WR08		
9	WR09		
10	WR10		
11	WR11		
12	WR12		
13	WR11		
14	WR14		
15	...		
16	...		
17	WR17		
18	WR18		
19	WR18-1		
20	WR18-2		
21	WR18-3		
...	...		
26	WR20		
27	WR21		

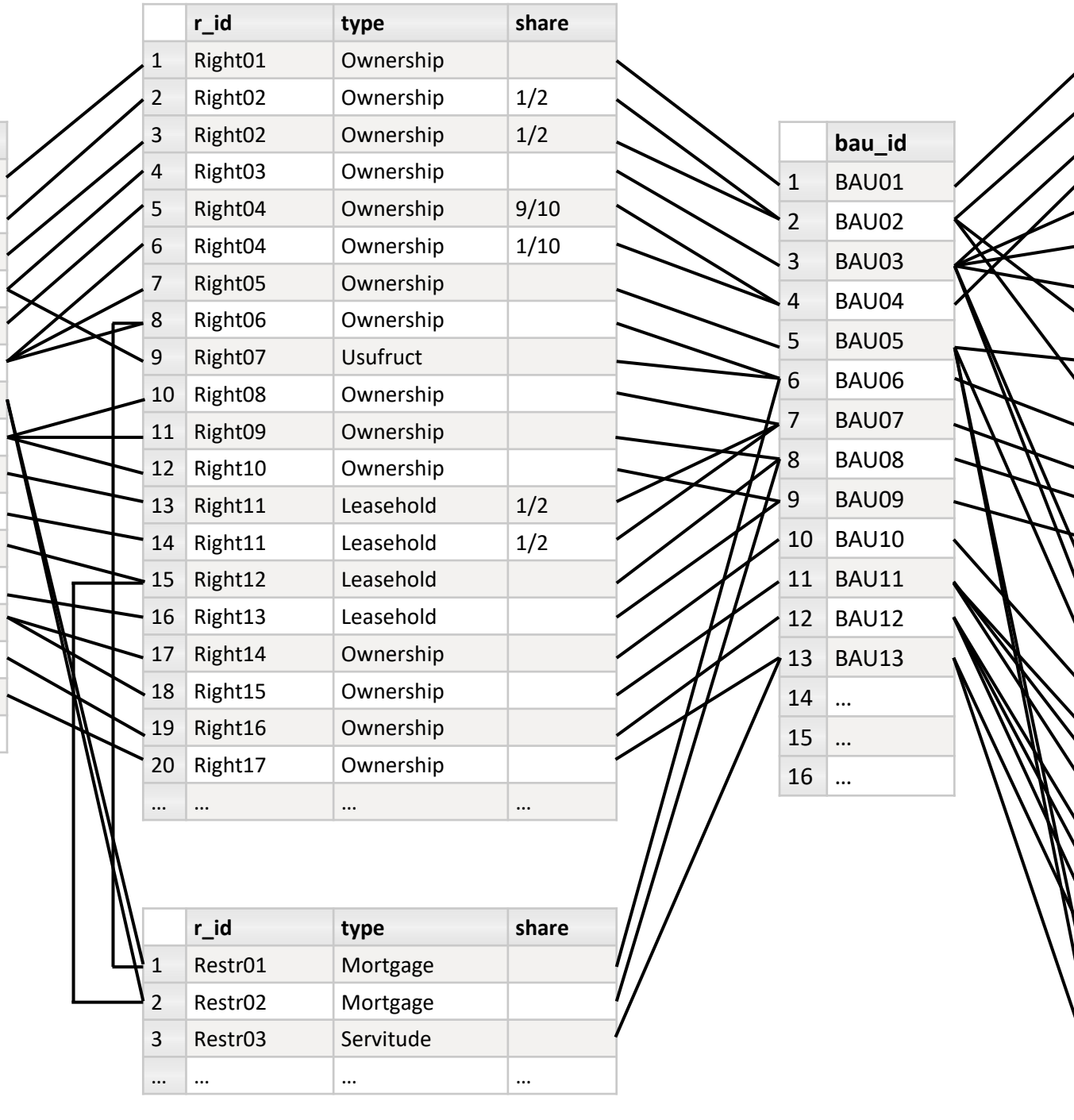
	p_id	name
1	P01	Carlos
2	P02	Thomas
3	P03	Elisabeth
4	P04	Municipality
5	P05	Anna
6	P06	Cooperation
7	P07	Capital Bank
8	P08	Housing Company
9	P09	Maria
10	P10	Johan
11	P11	Anton
12	P12	James
13	P13	Association of Owners
14	P14	Monique
15	P15	Eco Investment
16

	r_id	type	share
1	Right01	Ownership	
2	Right02	Ownership	1/2
3	Right02	Ownership	1/2
4	Right03	Ownership	
5	Right04	Ownership	9/10
6	Right04	Ownership	1/10
7	Right05	Ownership	
8	Right06	Ownership	
9	Right07	Usufruct	
10	Right08	Ownership	
11	Right09	Ownership	
12	Right10	Ownership	
13	Right11	Leasehold	1/2
14	Right11	Leasehold	1/2
15	Right12	Leasehold	
16	Right13	Leasehold	
17	Right14	Ownership	
18	Right15	Ownership	
19	Right16	Ownership	
20	Right17	Ownership	
...

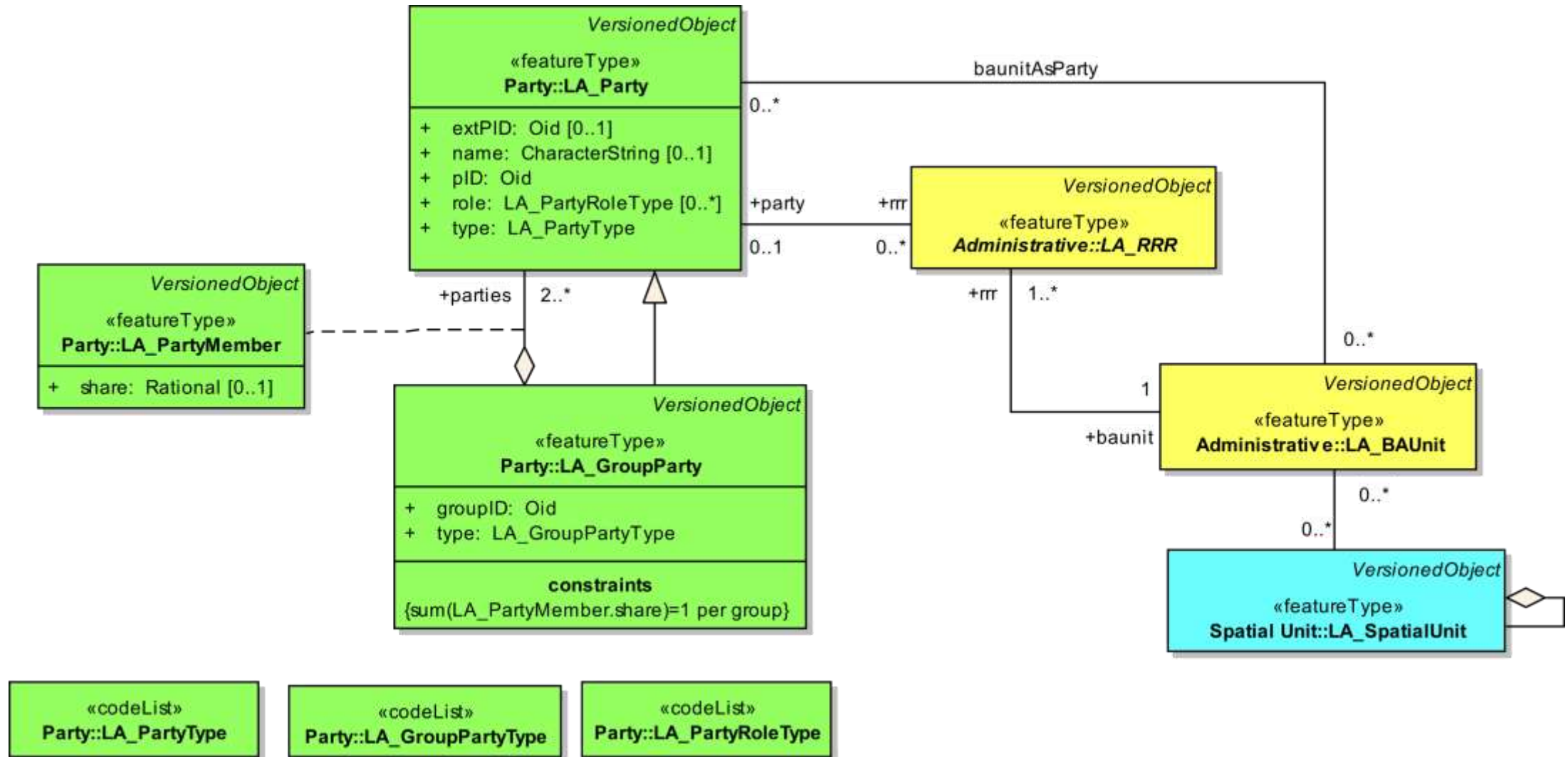
	r_id	type	share
1	Restr01	Mortgage	
2	Restr02	Mortgage	
3	Restr03	Servitude	
...

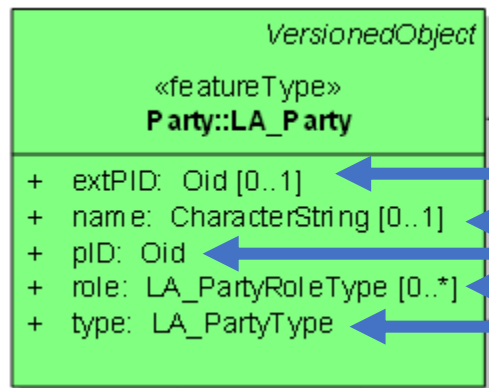
	bau_id
1	BAU01
2	BAU02
3	BAU03
4	BAU04
5	BAU05
6	BAU06
7	BAU07
8	BAU08
9	BAU09
10	BAU10
11	BAU11
12	BAU12
13	BAU13
14	...
15	...
16	...

	su_id	area	geom	...
1	WR01			
2	WR02			
3	WR03			
4	WR04			
5	WR05			
6	WR06			
7	WR07			
8	WR08			
9	WR09			
10	WR10			
11	WR11			
12	WR12			
13	WR13			
14	WR14			
15	WR15			
16	WR16			
17	WR17			
18	WR18			
19	WR18-1			
20	WR18-2			
21	WR18-3			
22	WR18-4			
23	WR18-5			
24	WR18-6			
25	WR19			
26	WR20			
27	WR21			
28	WR22			
...	...			



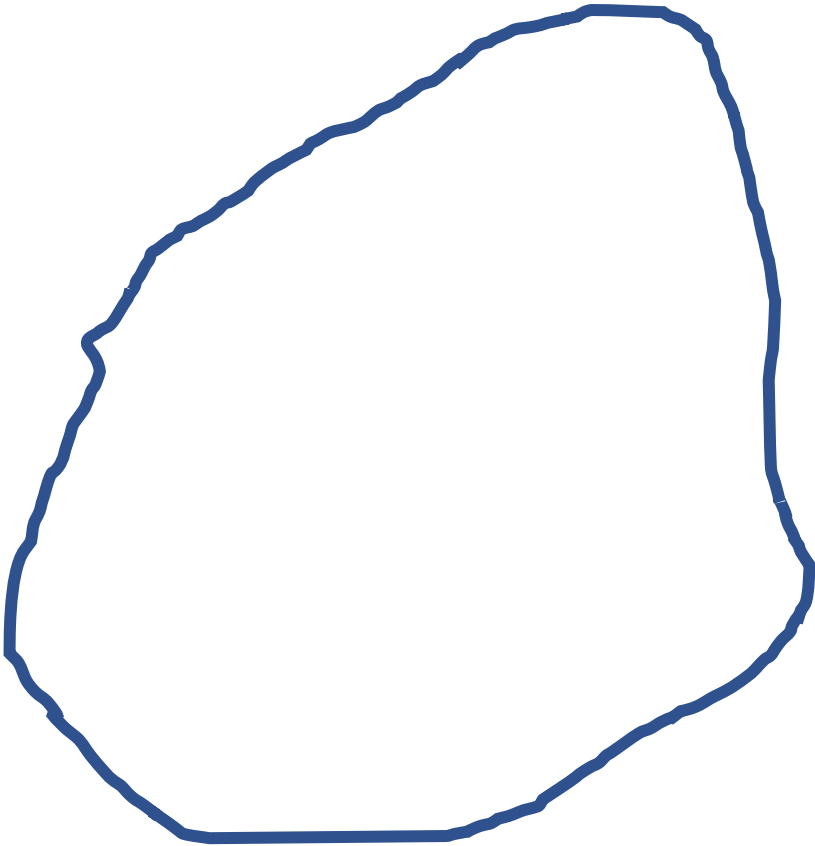
Party Package



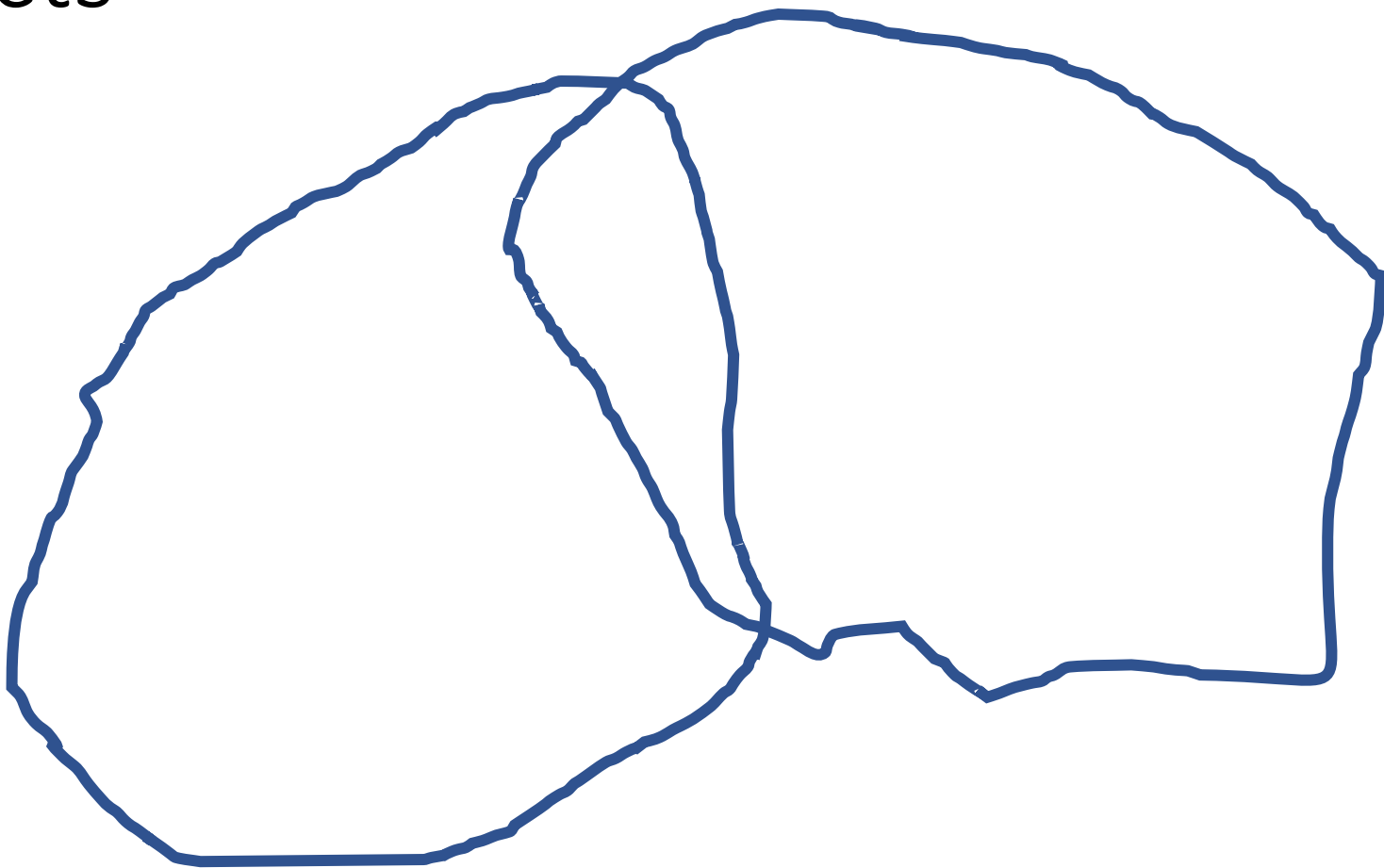


extPID	name	pID	role	type
-	Carlos	P01	Citizen	naturalPerson
-	Thomas	P02	Citizen	naturalPerson
-	Elizabeth	P03	Citizen	naturalPerson
-	Municipality	P04	Government	nonNaturalPerson
-	Anna	P05	Citizen	naturalPerson
-	Cooperation	P06	Citizen	naturalPerson
-	Capital Bank	P07	Money Provider	nonNaturalPerson
	Housing Company			

Conflicts



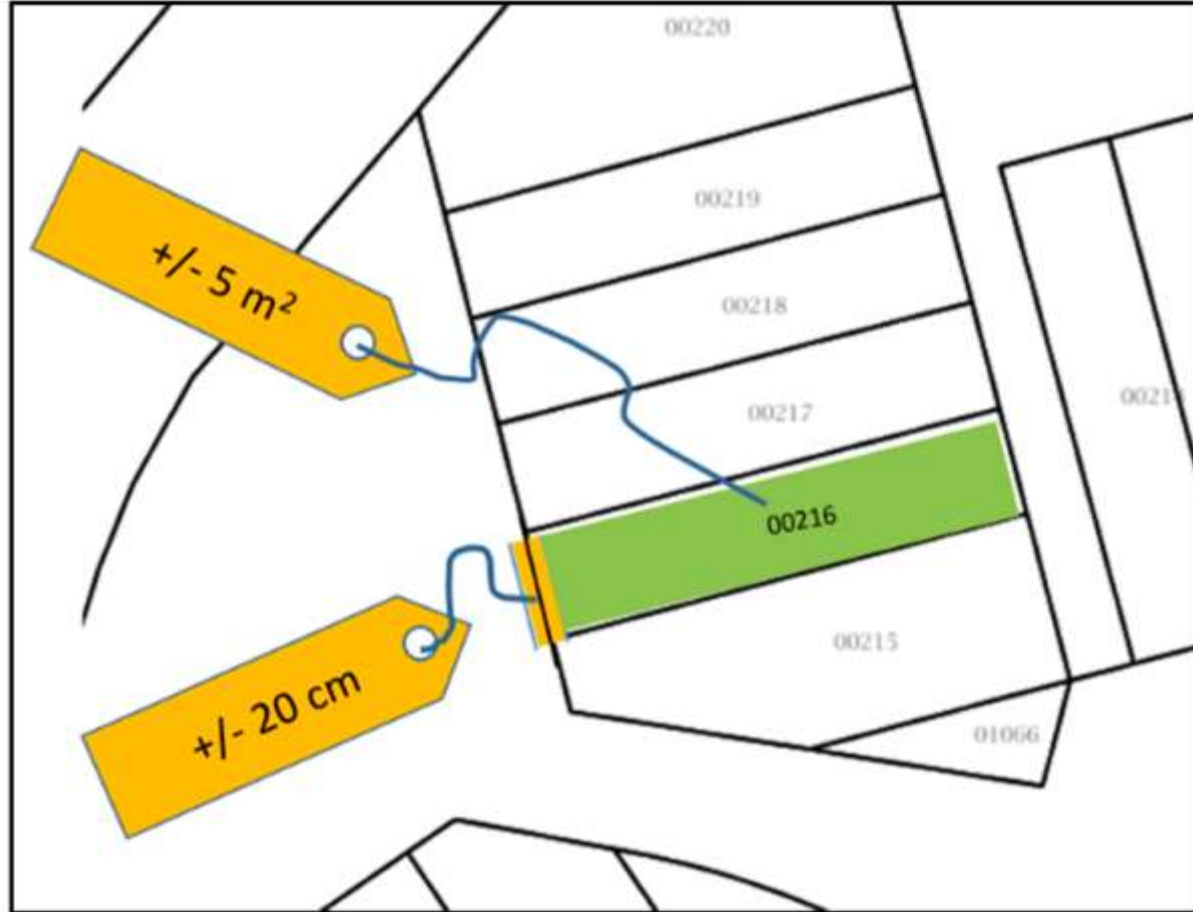
Conflicts

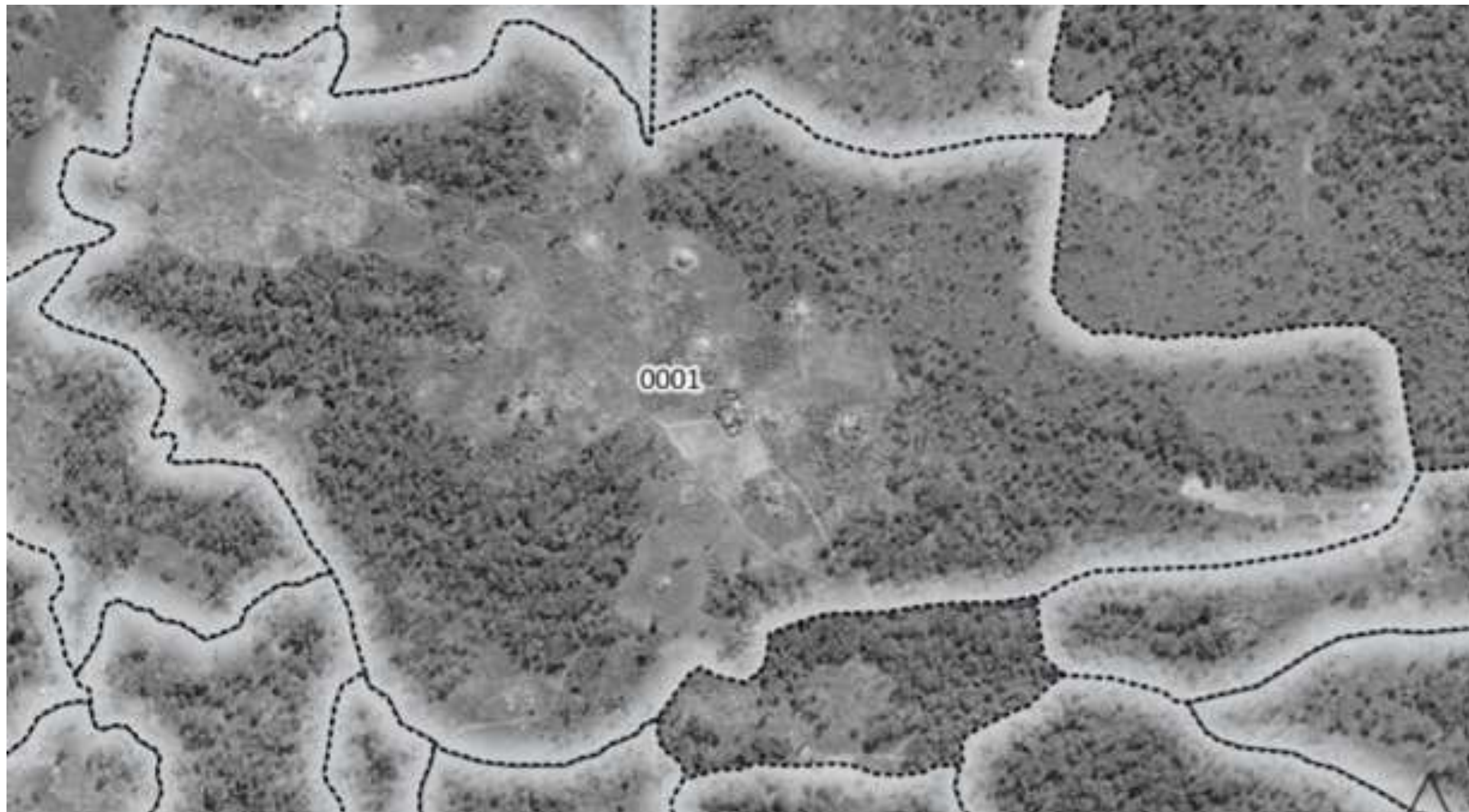


Women working as tractor

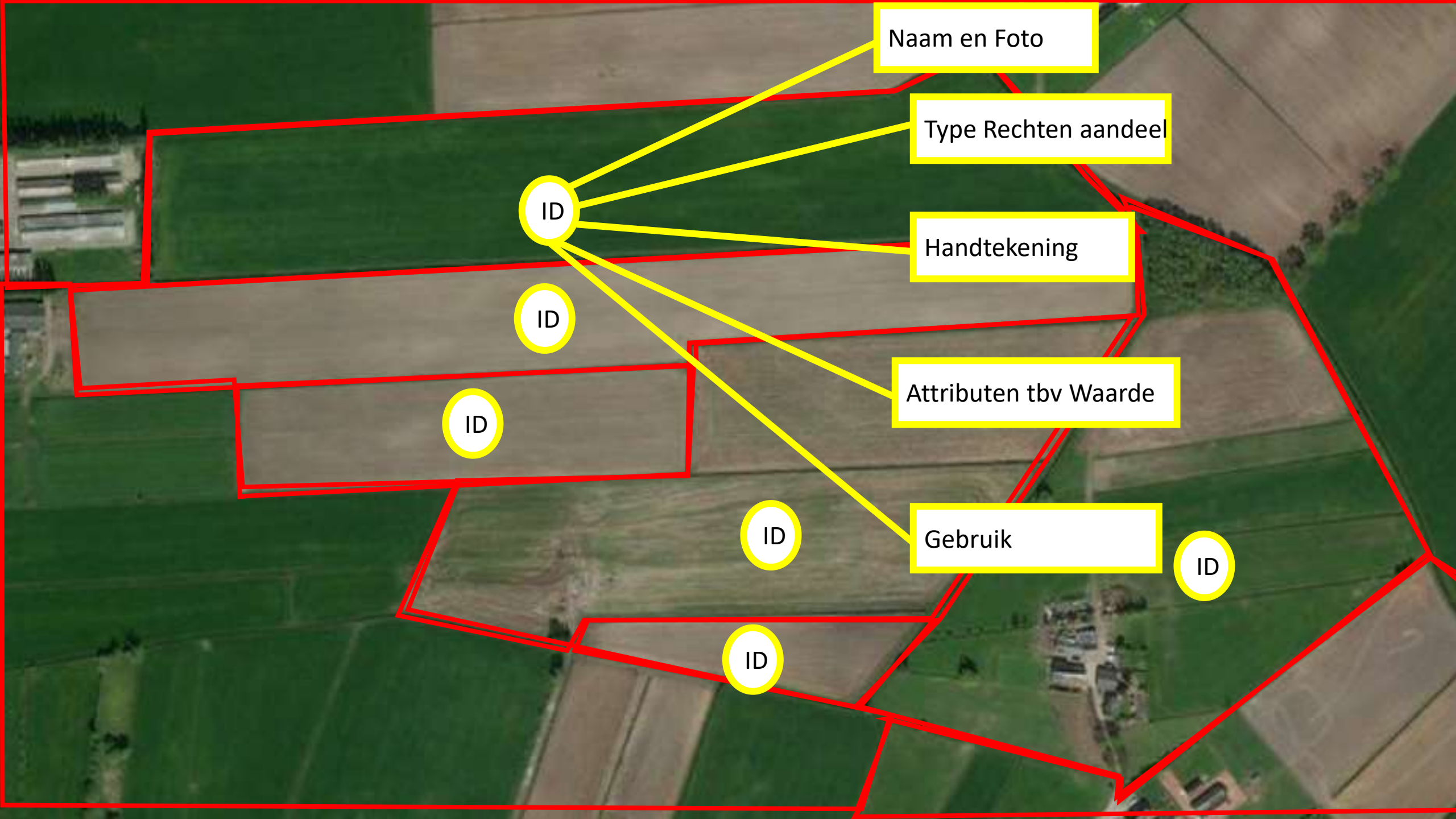












Naam en Foto

Type Rechten aandeel

Handtekening

Attributen tbv Waarde

Gebruik

ID

ID

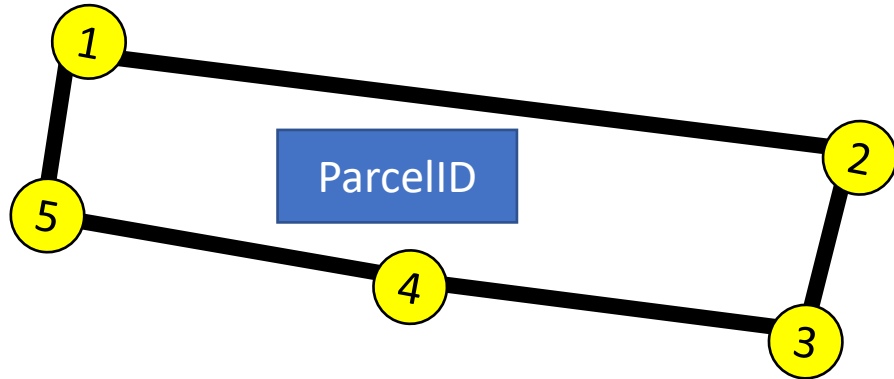
ID

ID

ID

ID

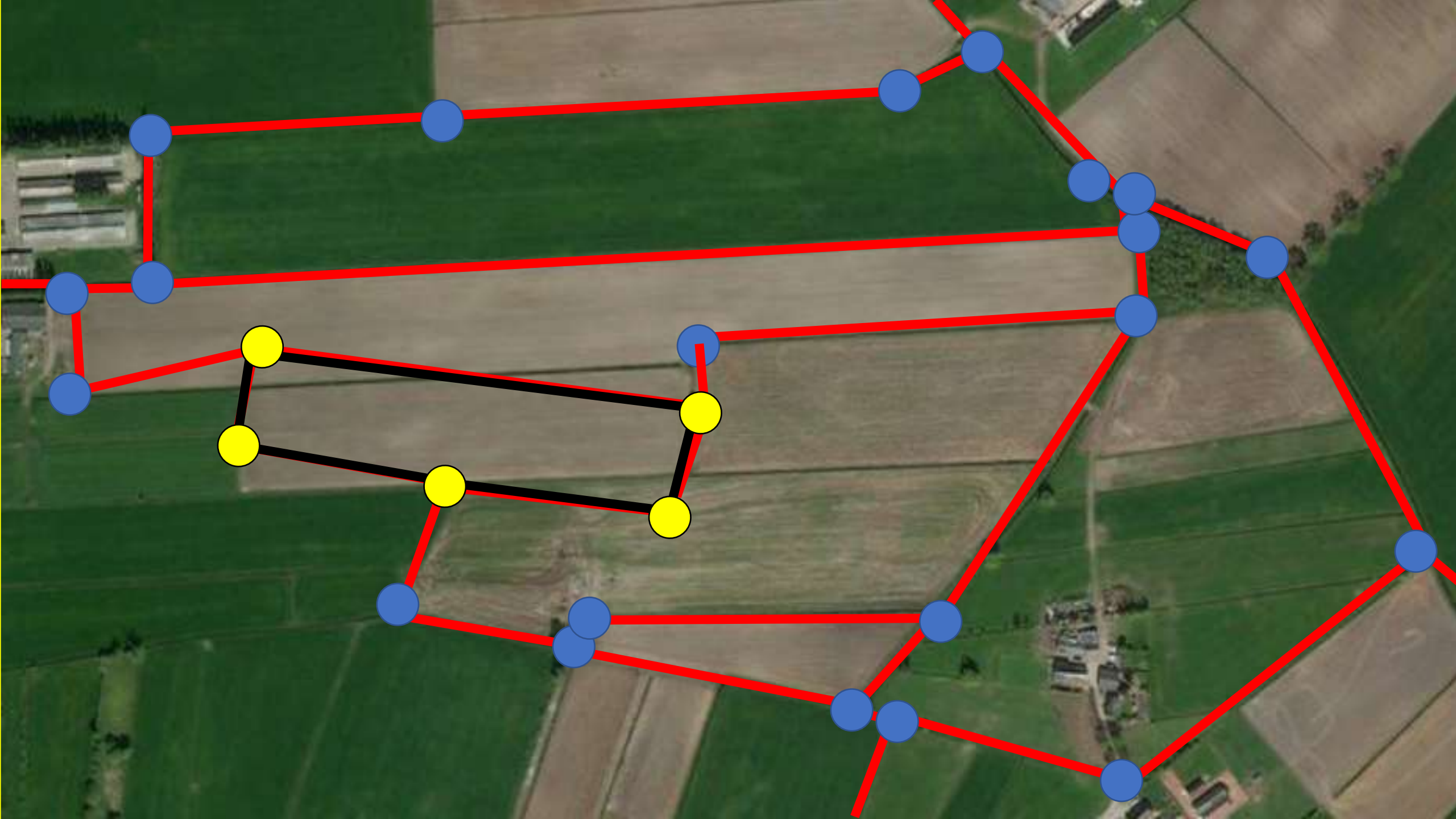
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1	Wooden peg	X1	Y1
2	Wooden peg	X2	Y2
3	Concrete	X3	Y3
4	Concrete	X4	Y4
5	Iron Pipe	X5	Y5



Title

Name
Date of Birth
Person Id
Photo
m/f
Parcel ID and Area
Signature/Fingerprint

Point id	Monumentation type	X	Y
1	Wooden peg	X1	Y1
2	Wooden peg	X2	Y2
3	Concrete	X3	Y3
4	Concrete	X4	Y4
5	Iron Pipe	X5	Y5



Observations

- A standard for the LA domain – can be made
- Also for addresses, land use, land cover,... – semantic interoperability
- Accuracy is about linking – that is the focus of attention
- Multiplier – scalability
- Attributes – minimise because of liability
- Area – between limits, publish the lower one
- Monumentation – participatory if monumentation is needed
- Integrated approach – legal and spatial expert in the field
- It is impossible to calculate any parcel area with 100% precision – McKenna



Compare

Alternative 1

- 100 years
- High Costs
- Technology driven
- By Government
- Rigid

Alternative 2

- 10 years
- Low Costs
- Demand driven
- By Citizens
- Transparent

People



Land



People to land relationships



Land



Thanks



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FIG Commission 7 & 2 - Annual Meeting 2023

2-4 October 2023 (Kick-off evening on 01 October)