Geospatial Data in Cyprus:
A Dual Focus on Quality and Usability

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Agenda

- Introduction
- Data quality
- Data usability
- Case studies
- Key Takeaways & Conclusion

Quality and Usability of Geospatial Data

Geospatial data is a critical backbone for:

- ✓ national planning,
- ✓ emergency services &
- ✓ business development

Key Goals

- High-Quality Spatial Data (across sectors)
- Interoperable Datasets
- Cross-Sector Access

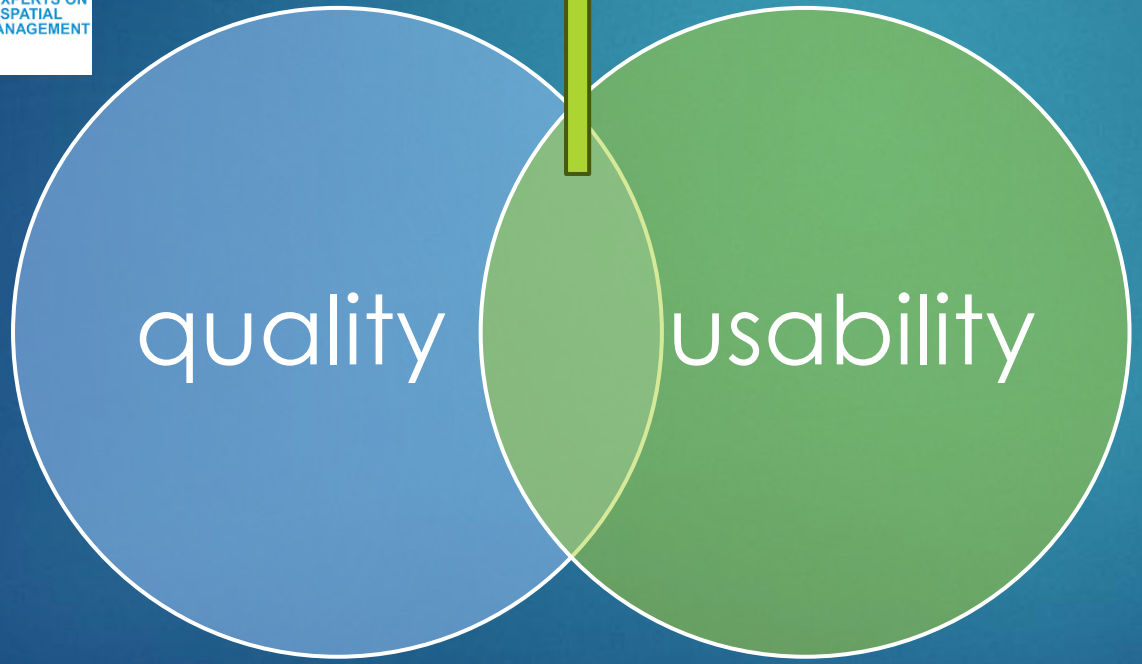
Challenges

- Fragmented Management
- Incomplete Mapping
- Inconsistent Standards

Despite challenges in Cyprus, we focus on making it accurate, reliable, and usable for everyone.

Data quality and usability in Cyprus: The Role of DLS

Empowering Cyprus with trusted geospatial information



DLS maintains:

- Cadastral parcels
- Administrative units
- Residential areas and Buildings
- Geographical names
- Aerial imagery
- etc

Supporting Cyprus' alignment with EU and UN geospatial data principles

What is data quality:
Ensuring Trustworthy Information

Data quality

- accuracy
- completeness
- reliability

- IS THE DATA CORRECT?
  ensures correctness
- ARE ALL FEATURES INCLUDED?
  ensures no gaps
- CAN WE TRUST IT?
  ensures consistency

What is data quality:
Data Production for Cartographic Needs

- DLS produces its own geospatial data to meet internal cartographic needs.
- Fundamental datasets (e.g. road network, administrative boundaries, building units, land cover) form the core of our maps.
- Main method: Digitizing from high-resolution aerial photography (10 cm).
- Ensures highly accurate spatial data suitable for detailed mapping and analysis.
- Cartographic database scale: 1:1k

Extending Beyond Our Official Mandate

DLS creates & Maintains Additional Datasets to fill operational gaps
(meet own operational needs and support other organizations)

- Why:
  Some agencies lack the expertise, infrastructure, or capacity to manage their datasets. As a result, they rely on DLS for authoritative geospatial data

- Examples:

  Planning Zones – Department of Town Planning & Housing

  Postal Code Boundaries – Department of Postal Services

Filling the Gaps: DLS Supports National Geospatial Data

Promoting Data Ownership & Innovation

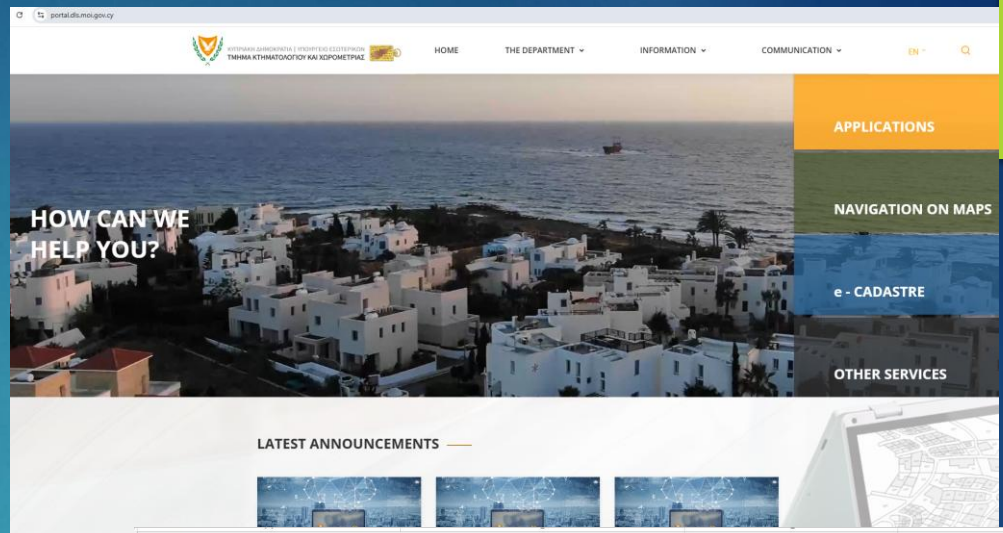
- Consistency Across Agencies
  External data owners must maintain and share their datasets reliably
- DLS Leadership
  Encouraging a culture of data ownership and accountability in the public sector
- Workflow Automation
  Streamlining processes for efficiency and accuracy
- Modern Cartographic Products
  Upgrading products to keep pace with technology

What is data usability:

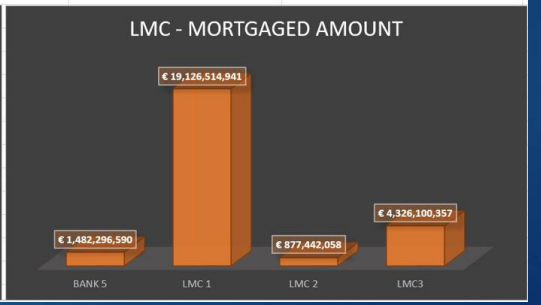
Making Data Work for People

Data usability

- **accessible**
  - OPEN ACCESS
- **actionable**
  - TOOLS OR ANALYTICS
- **user engagement**
  - USER COMMUNITY



CILIS - MASS TRANSFERS OF MORTGAGES			
BANK (FROM)	BANK (TO)	NUMBER OF MORTGAGES	MORTGAGED AMOUNT
BANK 1	BANK 2	45,597	€ 11,543,821,387
BANK 1	BANK 2	2,448	€ 596,943,056
BANK 1	BANK 2	429	€ 109,965,560
BANK 3	BANK 2	204	€ 44,163,668
	TOTALS:	**48,678**	**€ 12,294,893,670**
BANK (FROM)	LOAN MANAGEMENT CO (TO)	NUMBER OF MORTGAGES	MORTGAGED AMOUNT
BANK 4	BANK 5	1,439	€ 1,482,296,590
BANK 6	LMC 1	6,057	€ 19,126,514,941
BANK 7	LMC 2	771	€ 877,442,058
BANK 6	LMC3	7,849	€ 4,326,100,357
	TOTALS:	**16,116**	**€ 25,812,353,945**



Our website attracted over 9 million visitors in 2025

Data Usability

Who uses the data

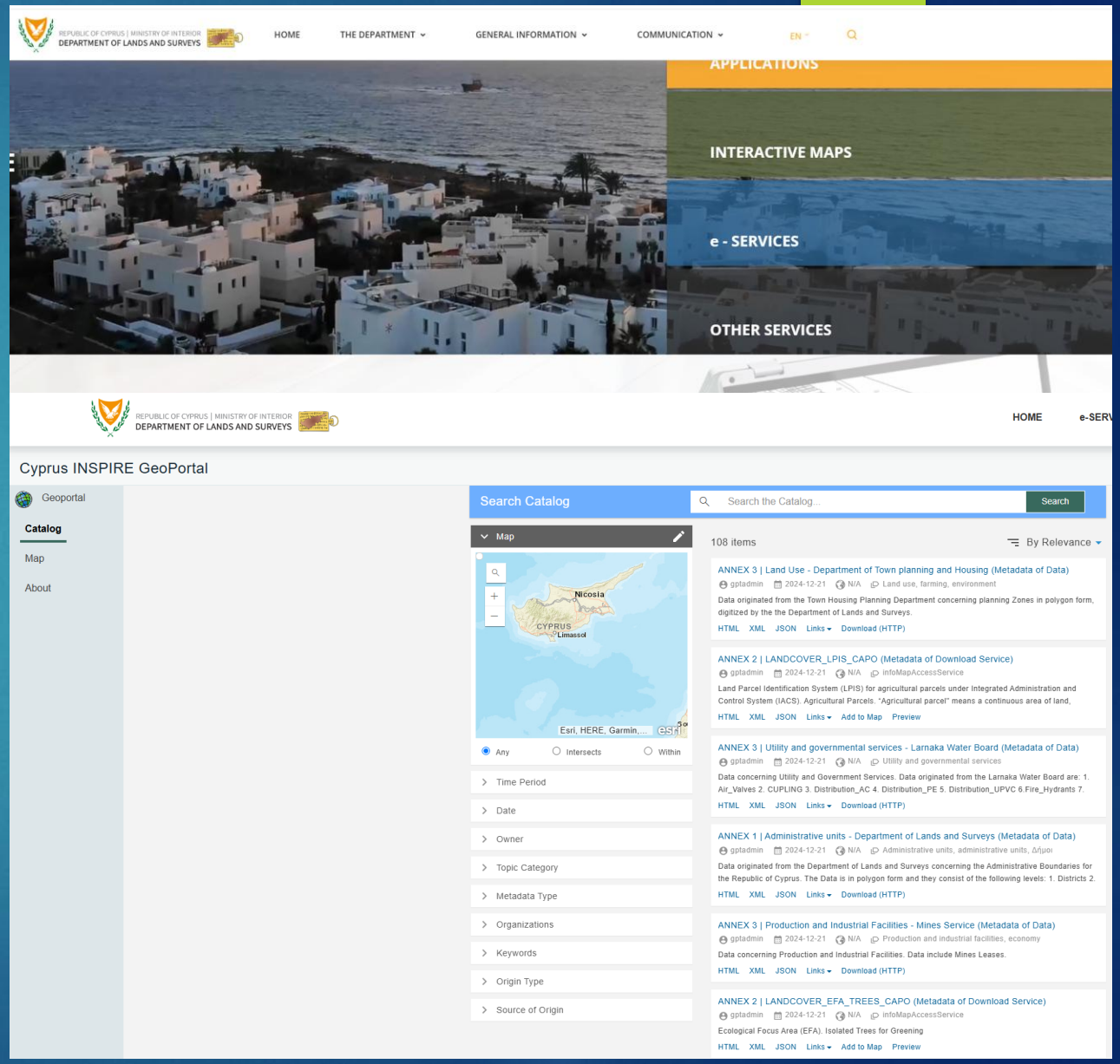
- Users:
  - Citizens (general public accessing maps and services)
  - Local authorities
  - Banks
  - Professional groups (surveyors, real estate valuers)
  - Private sector (developers, logistics)
  - Academia (students and researchers)
  - European/International bodies (Eurogeographics, Eurostat, UN)
- Access channels:
  - "DLS PORTAL" (central national access point)
  - CY/INSPIRE Geoportal

    INSPIRE Geospatial Data

    Less Detailed: Contains fewer attributes than national datasets

    Reduced detail affects analytical and operational value

    Harder to Access: More complex access procedures



Case – Road Network dataset

challenge

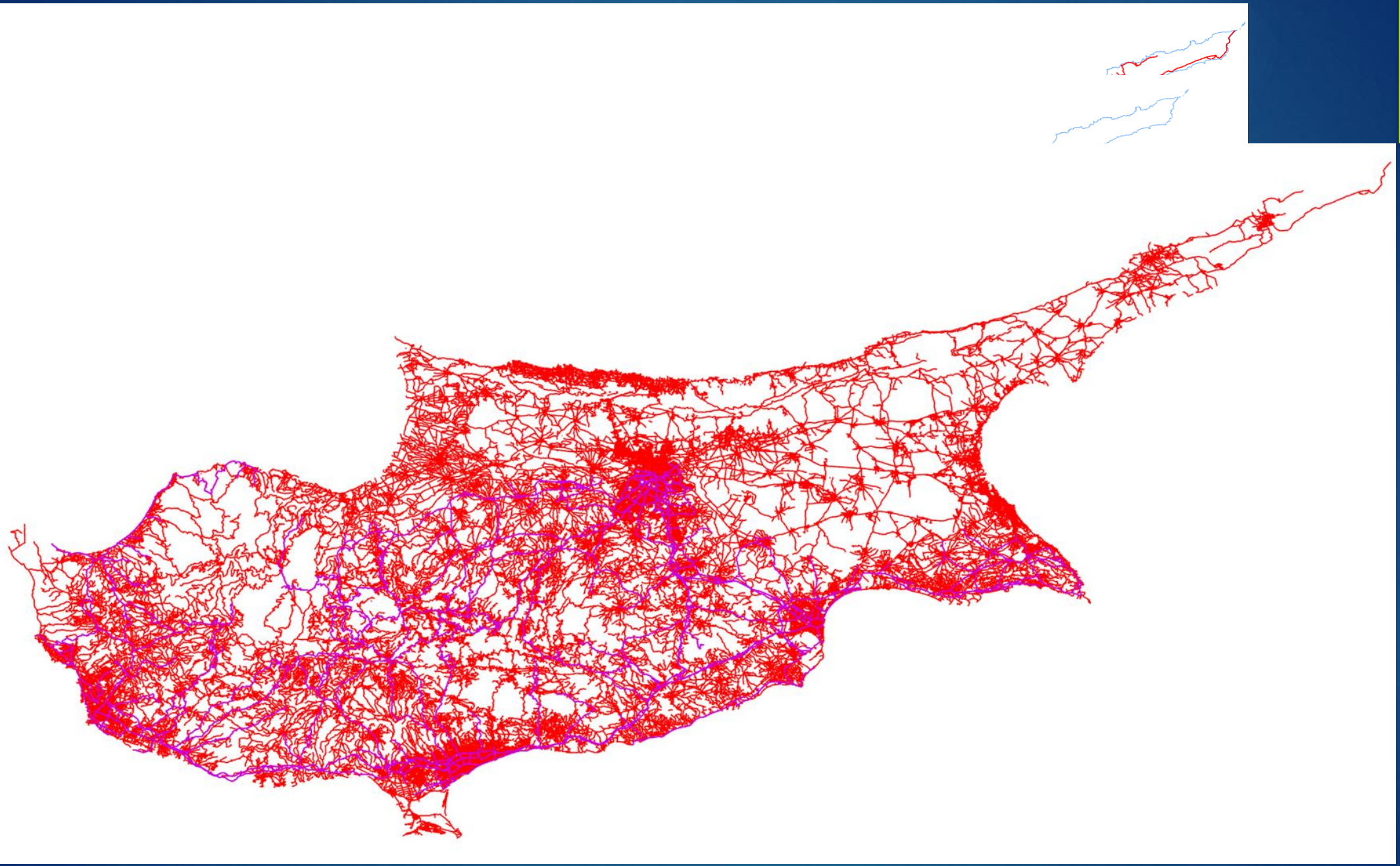
- Multiple authorities manage different road segments
- No single coordinating body

impact

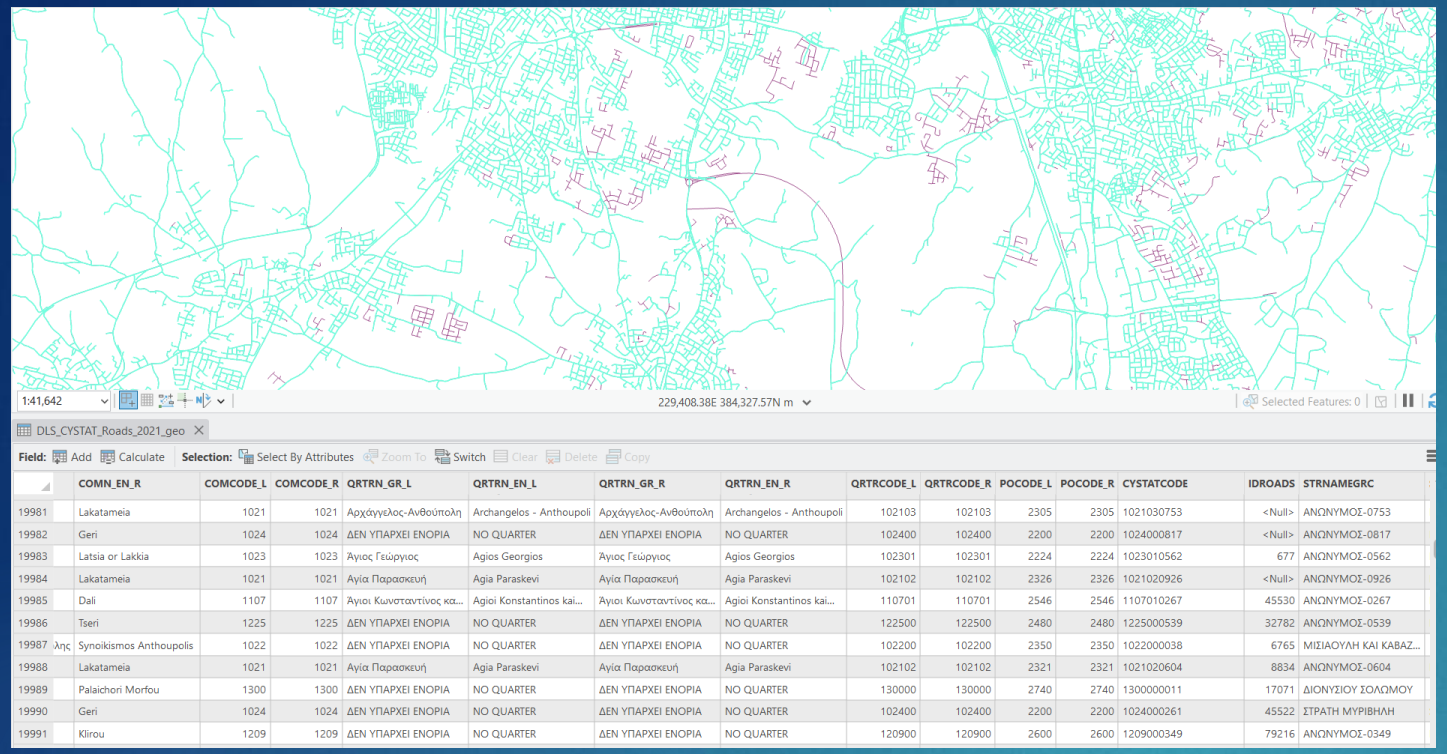
- Inconsistent data standards and formats
- Limited data sharing and integration
- duplication
- Hinders evidence-based planning

solutions

- Establish a central coordinating authority
- Implement common data standards and interoperability



Road Network



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19985	Dali	1107	1107	Άγιοι Κωνσταντίνος κα...	Agioi Konstantinos kai...	Άγιοι Κωνσταντίνος κα...	Agioi Konstantinos kai...	110701	110701	2546	2546	1107010267	45530	ΑΝΩΝΥΜΟΣ-0267
19986	Tseri	1225	1225	ΔΕΝ ΥΠΑΡΧΕΙ ΕΝΟΡΙΑ	NO QUARTER	ΔΕΝ ΥΠΑΡΧΕΙ ΕΝΟΡΙΑ	NO QUARTER	122500	122500	2480	2480	1225000539	32782	ΑΝΩΝΥΜΟΣ-0539
19987	Synoikismos Anthoupolis	1022	1022	ΔΕΝ ΥΠΑΡΧΕΙ ΕΝΟΡΙΑ	NO QUARTER	ΔΕΝ ΥΠΑΡΧΕΙ ΕΝΟΡΙΑ	NO QUARTER	102200	102200	2350	2350	1022000038	6765	ΜΙΣΙΑΟΥΛΗ ΚΑΙ ΚΑΒΑΖ...
19988	Lakatameia	1021	1021	Αγία Παρασκευή	Agia Paraskevi	Αγία Παρασκευή	Agia Paraskevi	102102	102102	2321	2321	1021020604	8834	ΑΝΩΝΥΜΟΣ-0604
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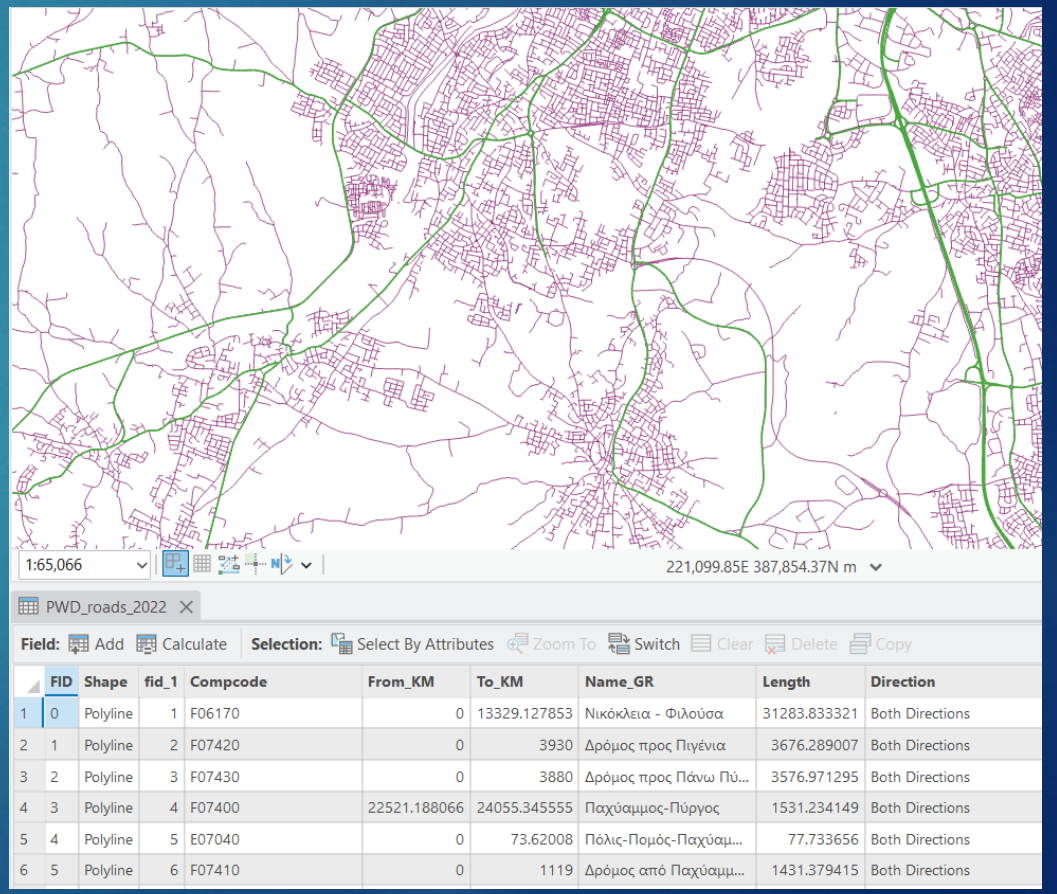
19990	Geri	1024	1024	ΔΕΝ ΥΠΑΡΧΕΙ ΕΝΟΡΙΑ	NO QUARTER	ΔΕΝ ΥΠΑΡΧΕΙ ΕΝΟΡΙΑ	NO QUARTER	102400	102400	2200	2200	1024000261	45522	ΣΤΡΑΤΗ ΜΥΡΙΒΗΛΗ
19991	Klirou	1209	1209	ΔΕΝ ΥΠΑΡΧΕΙ ΕΝΟΡΙΑ	NO QUARTER	ΔΕΝ ΥΠΑΡΧΕΙ ΕΝΟΡΙΑ	NO QUARTER	120900	120900	2600	2600	1209000349	79216	ΑΝΩΝΥΜΟΣ-0349

CYStat Road Data

PWD Road Data



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2	1	Polyline	2	F07420	0	3930	Δρόμος προς Πιγένια	3676.289007	Both Directions
3	2	Polyline	3	F07430	0	3880	Δρόμος προς Πάνω Πύ...	3576.971295	Both Directions
4	3	Polyline	4	F07400	22521.188066	24055.345555	Παχύαμμος-Πύργος	1531.234149	Both Directions
5	4	Polyline	5	E07040	0	73.62008	Πόλις-Πομός-Παχύαμ...	77.733656	Both Directions
6	5	Polyline	6	F07410	0	1119	Δρόμος από Παχύαμμ...	1431.379415	Both Directions

Case – Road Network , DLS dataset

- Mapping updates are incomplete

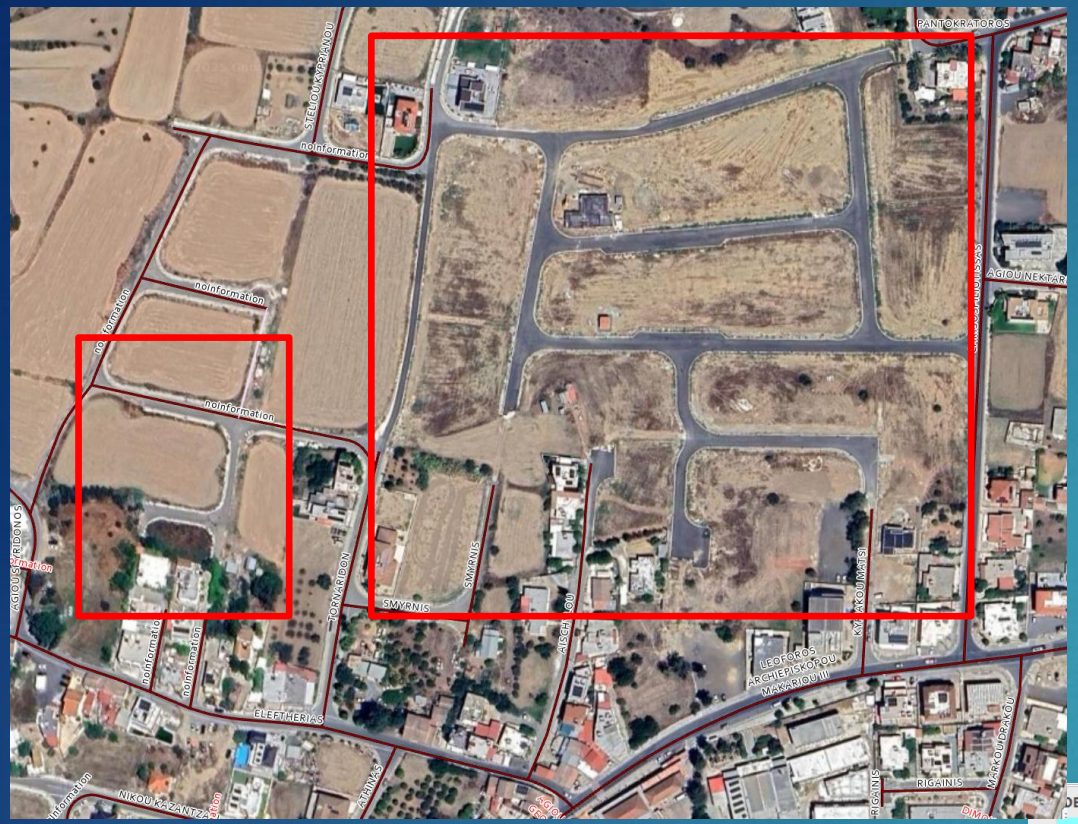
Impact: outdated data & maps

- Missing attributes (e.g. road names & start/end points)

Impact: may lead to incomplete search results or analysis, user confusion, and potential reputational risks

- Existing Updating Process: (Continuous Data Enrichment)
  - Input Sources:
    - Municipalities feedback
    - Cadastral maps
    - User contributions
    - Pilot projects to investigate the application of ML/DL tools for change detection

- Goal: Keep geospatial data current, accurate, and relevant



	OBJECTID *	Feature Code	Feature Code Subtype	..	A...	C...	...	N..	L...	..	Physical...	U...	Width	..	Geographic Name Inf...	Geographic Name Inf...	...	No...	(Location Country) Desi...	Featu
4	550176	Road	ROAD_C	9	99	noIr	9	-9	999	...	noInformatic	n...	-999999	n	noInformation	noInformation	n...	No...	Republic of Cyprus	Close
5	551277	Road	ROAD_C	9	99	noIr	9	-9	999	...	noInformatic	n...	-999999	n	noInformation	noInformation	n...	No...	Republic of Cyprus	Close
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9	551954	Road	ROAD_C	9	99	noIr	9	-9	999	...	noInformatic	n...	-999999	n	AGIOU THERISOU	ΑΓΙΟΥ ΘΕΡΙΣΟΥ	n...	No...	Republic of Cyprus	Close
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11	552753	Road	ROAD_C	9	99	noIr	9	-9	999	...	Intact	n...	-999999	n	CHRISOSPILIOTISSAS	ΧΡΥΣΟΣΠΗΛΙΩΤΙΣΣΑΣ	n...	No...	Republic of Cyprus	Close
12	552828	Road	ROAD_C	9	99	noIr	9	-9	999	...	Intact	n...	-999999	n	noInformation	noInformation	n...	No...	Republic of Cyprus	Close
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14	553995	Road	ROAD_C	9	99	noIr	9	-9	999	...	Intact	n...	-999999	n	noInformation	noInformation	n...	nol...	Republic of Cyprus	Close
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16	656633	Road	ROAD_C	9	99	noIr	9	-9	999	...	noInformatic	n...	-999999	n	AGIOU NEKTARIOU	ΑΓΙΟΥ ΝΕΚΤΑΡΙΟΥ	n...	No...	Republic of Cyprus	Close

Road Network

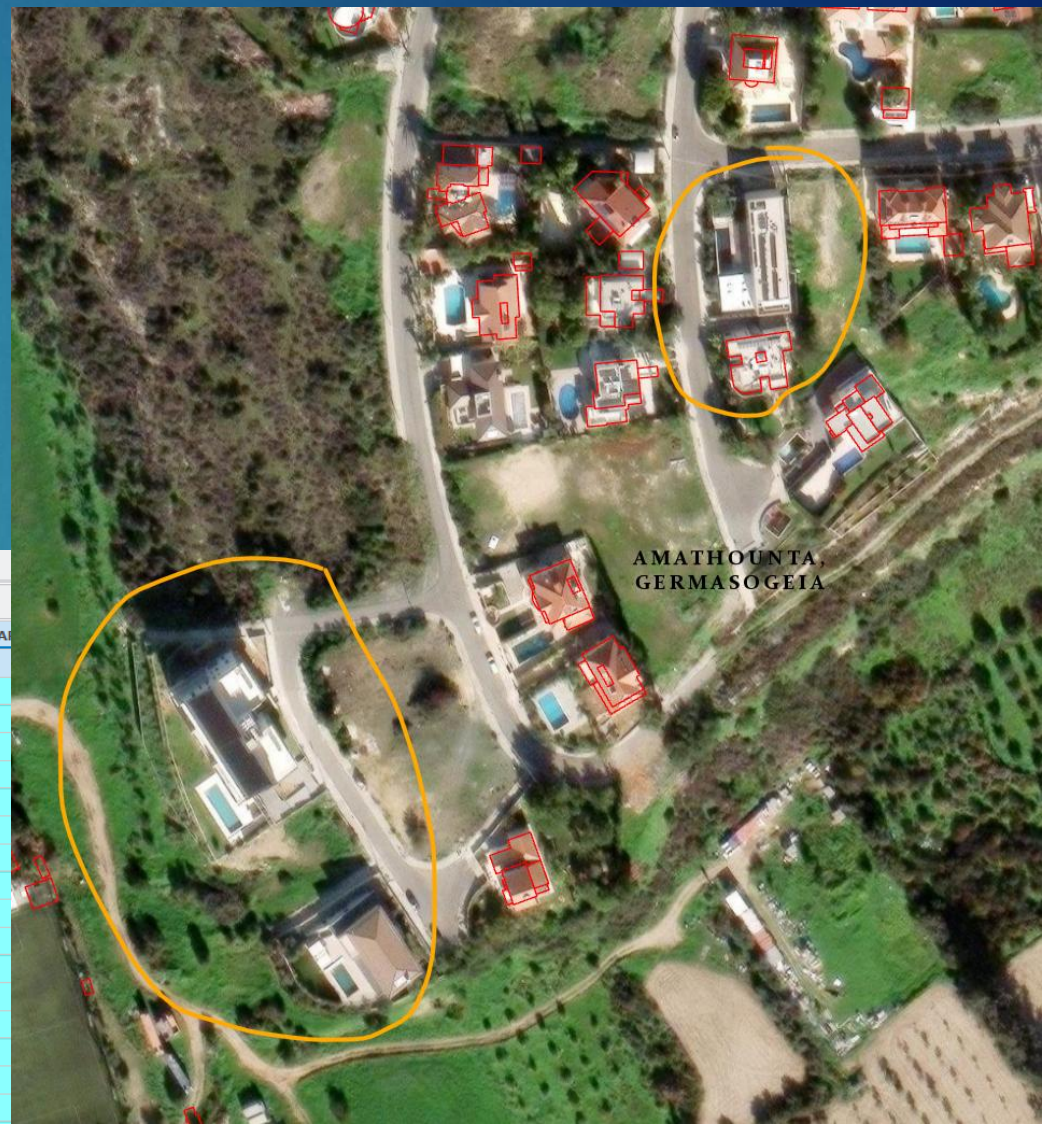
Case – residential and building data

- Problems identified:
  - missing data: height, no of floors, classification
  - Incomplete coverage: some residential areas not mapped
  - Impact: limits urban planning, risk management
- exploring enhanced approaches:
  - AI and machine learning
  - remote sensing to detect coverage

Case – residential and building data-DLS

Building Units (BU) Data – Current Status

- Latest complete BU dataset: based on 2014 imagery
- New buildings identified in 2019 (point data only)
- Missing information: building footprints not yet captured
- Challenges in highly dense areas: possible misinterpretations of structures
- Building height data: estimated number of floors (from height values)
- Numerous data requests received – TPH, academia, municipalities



GISPHOTO.photo_bldg

Field: Add Calculate | Selection: Select By Attributes Zoom To Switch Clear Delete Copy

	OBJECTID *	GND_FLOOR	FLOOR_QTY	ROOF_TYPE	B_TYPE	BLD_ID	BLOCK	H_ROOF_A_M	H_EAVE_B_M	H_MSL_M	VOL_CUBICM
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2	2601	1	3	Inclined Roof with on...	LowResidential Building with inclined roof	2600	5-2950-3725	11	8	73	559
3	2602	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2601	5-2950-3725	12,388142	11,378142	74,051858	108,75
4	2603	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2602	5-2950-3725	12,388142	11,128142	74,051858	108,78
5	2604	1	2	Inclined Roof with on...	LowResidential Building with inclined roof	2603	5-2950-3725	17,038142	15,398142	73,431858	691,2
6	2605	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2604	5-2950-3725	11,668142	11,228142	73,031858	185,84
7	2606	1	2	Inclined Roof with on...	LowResidential Building with inclined roof	2605	5-2950-3725	15,998142	14,698142	76,771858	705,63
8	2607	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2606	5-2950-3725	15,998142	11,938142	76,771858	107,31
9	2608	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2607	5-2950-3725	15,998142	10,988142	76,771858	12,34
10	2609	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2608	5-2950-3725	11,388142	10,228142	78,261858	20,59
11	2610	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2609	5-2950-3725	15,998142	10,548142	76,771858	42,54
12	2611	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2610	5-2950-3725	10,838142	10,468142	76,171858	13,17
13	2612	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2611	5-2950-3725	11,318142	10,638142	78,621858	30,54
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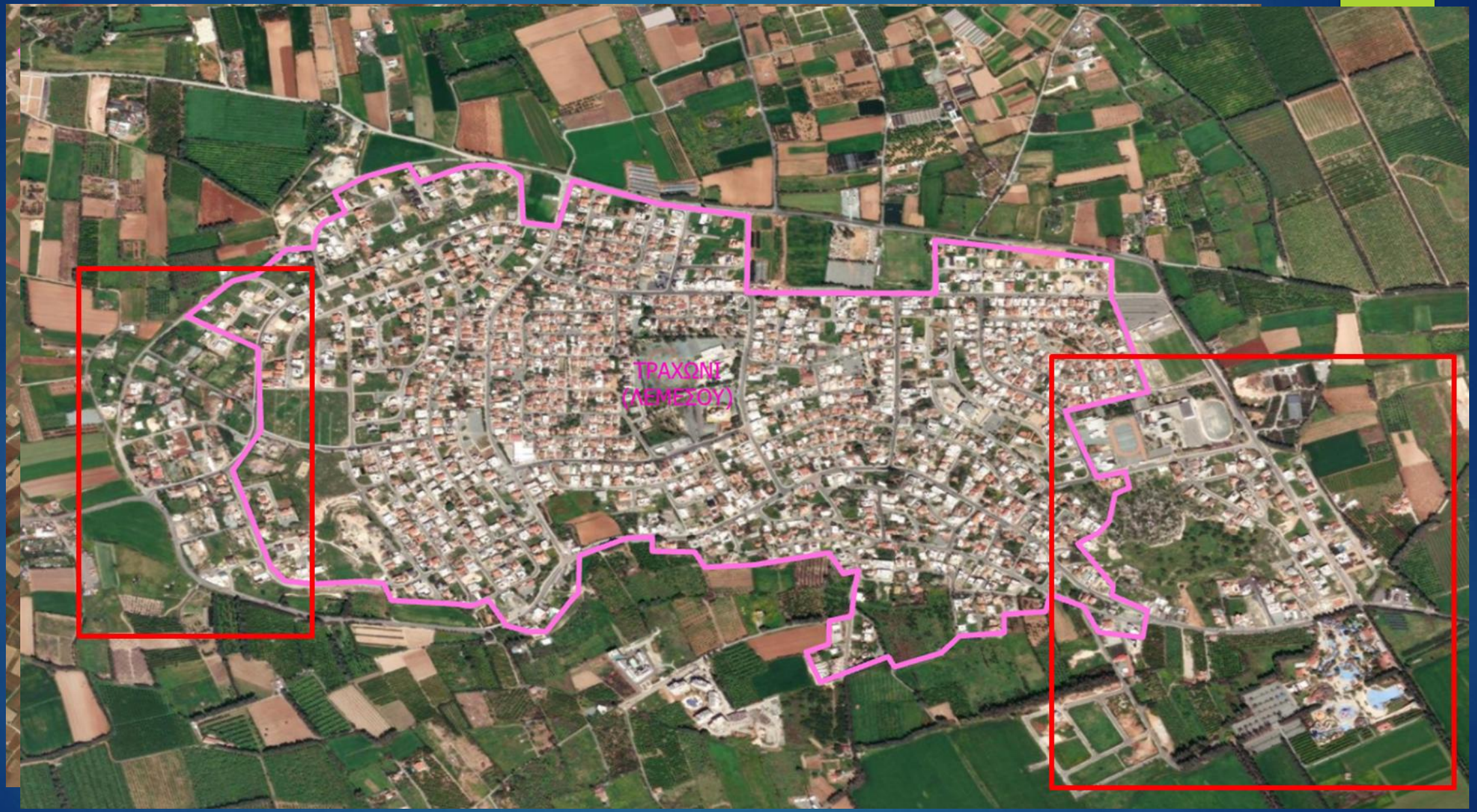
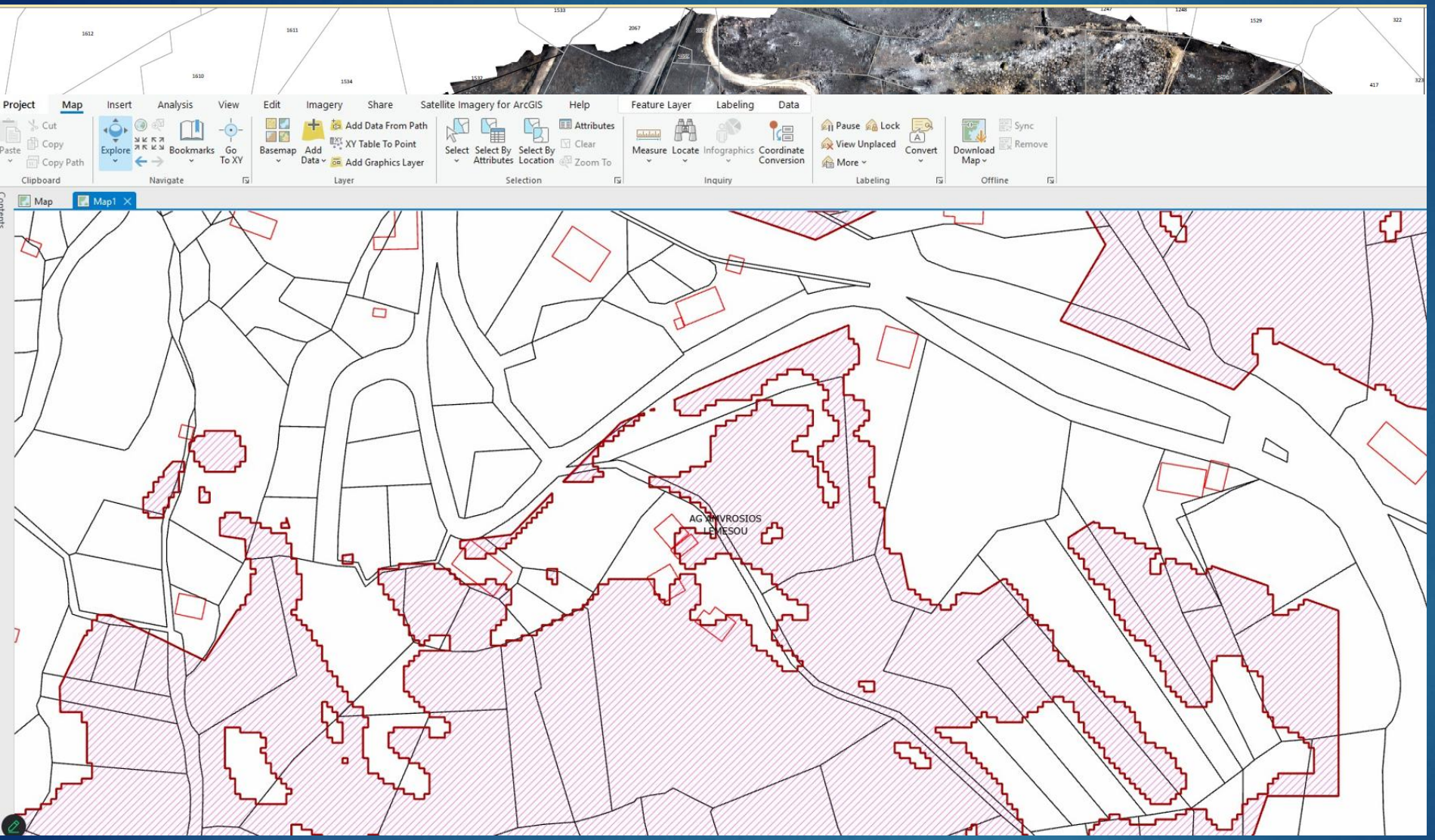
15	2614	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2613	5-2950-3725	16,818142	11,468142	81,351858	50,99
16	2615	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2614	5-2950-3725	16,818142	11,678142	81,351858	170,2
17	2616	0	1	Inclined Roof with on...	LowResidential Building with inclined roof	2615	5-2950-3725	16,818142	11,888142	81,351858	62,41



Expansion of the built-up area

Identifying Fire-Affected Property Owners (2025)

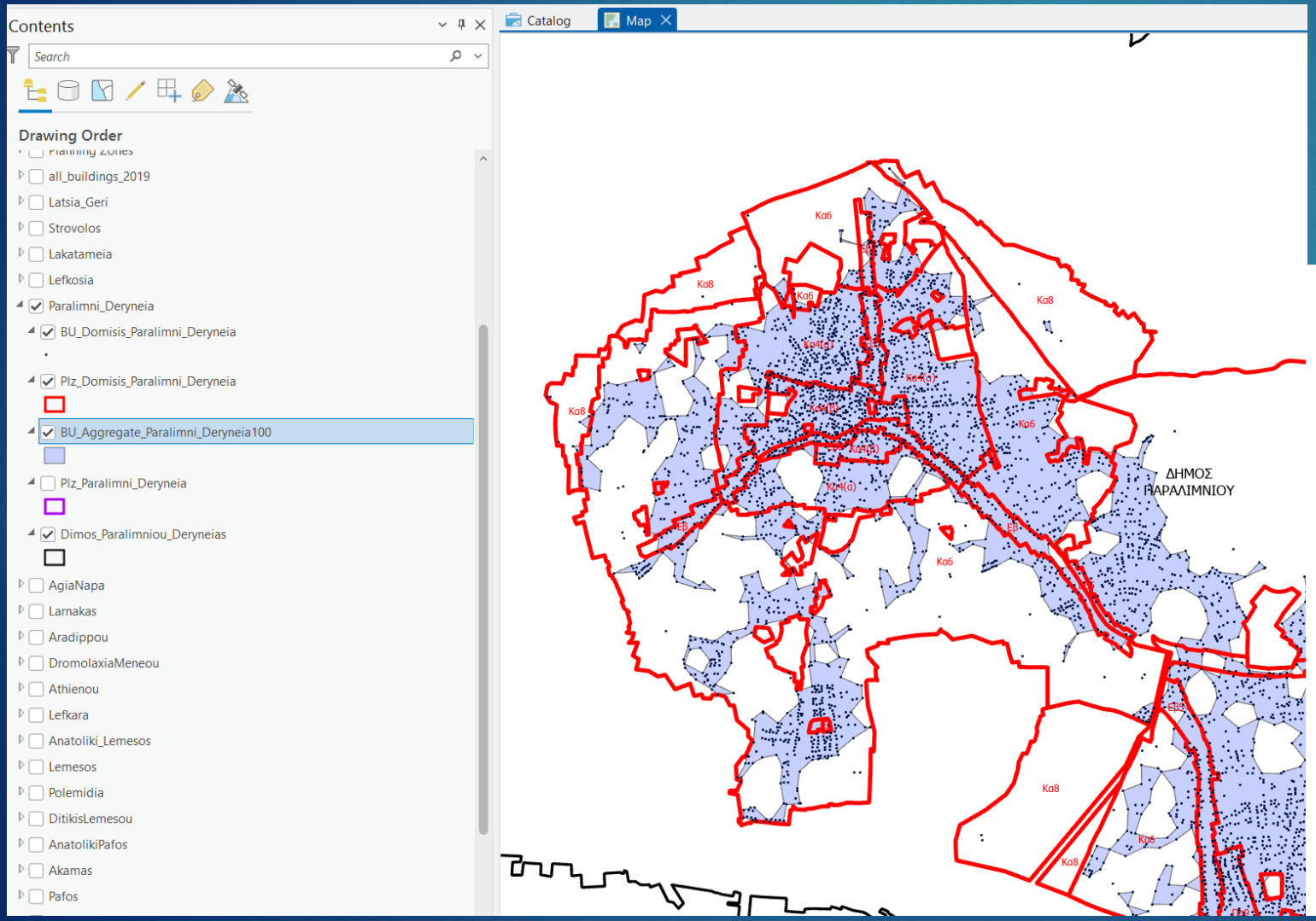


Spatial Analysis for damage assessment

BU data from Overture Maps were used instead of an updated dataset, causing spatial analysis errors due to misaligned features.

Residential density

Determine housing (residential) density at the municipal level across Cyprus



ΝΕΟΙ ΔΗΜΟΙ	ΣΥΝΟΛΟ ΚΑΤΟΙΚΙΩΝ	ΕΚΤΑΣΗ (τετρ.χλμ)	ΟΙΚΙΣΤΙΚΗ ΠΥΚΝΟΤΗΤΑ (αρ. κατοικιών/τετρ. χλμ)
Δήμος Αγίας Νάπας	13,678	133	103
Δήμος Αθηένου	2,002	58	35
Δήμος Ακάμα	11,223	142	79
Δήμος Ανατολικής Λεμεσού	24,397	93	262
Δήμος Ανατολικής Πάφου	6,159	43	143
Δήμος Αραδίππου	8,434	95	89
Δήμος Δρομολαξιάς - Μενεού	10,693	58	184
Δήμος Δυτικής Λεμεσού	12,792	180	71
Δήμος Λακατάμειας	20,414	55	371
Δήμος Λάρνακας	39,094	57	686
Δήμος Λατσιών – Γερίων	11,288	45	251
Δήμος Λεμεσού	56,829	45	1263
Δήμος Λευκάρων	2,005	152	13
Δήμος Λευκωσίας	58,081	55	1056
Δήμος Νότιας Λευκωσίας – Ιδαλίου	8,123	100	81
Δήμος Παραλιμνίου – Δερύνειας	26,710	107	250
Δήμος Πάφου	24,014	17	1413
Δήμος Πολεμιδιών	10,215	24	426
Δήμος Πόλης Χρυσοχούς	6,834	248	28
Δήμος Στροβόλου	32,592	25	1304

Case – address system gaps

Key Challenges in the Address System

challenge

- Multiple authorities manage different road and address characteristics (street naming, numbering, road boundaries, etc.)
- No single coordinating body

impact

- Inconsistent data standards and formats
- Limited data sharing and integration
- duplication
- Hinders evidence-based planning
- Data unreliability and reputational risk

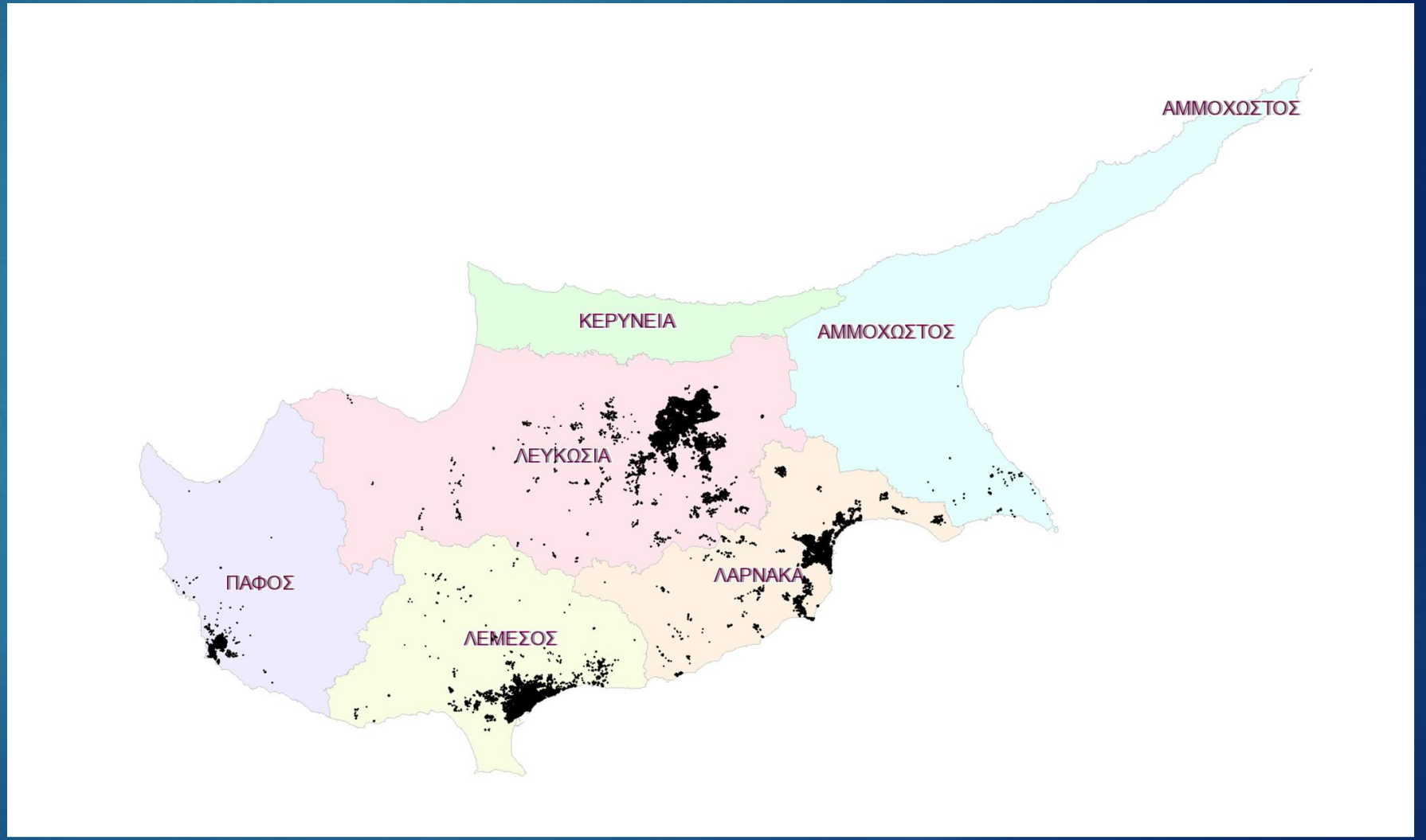
solutions

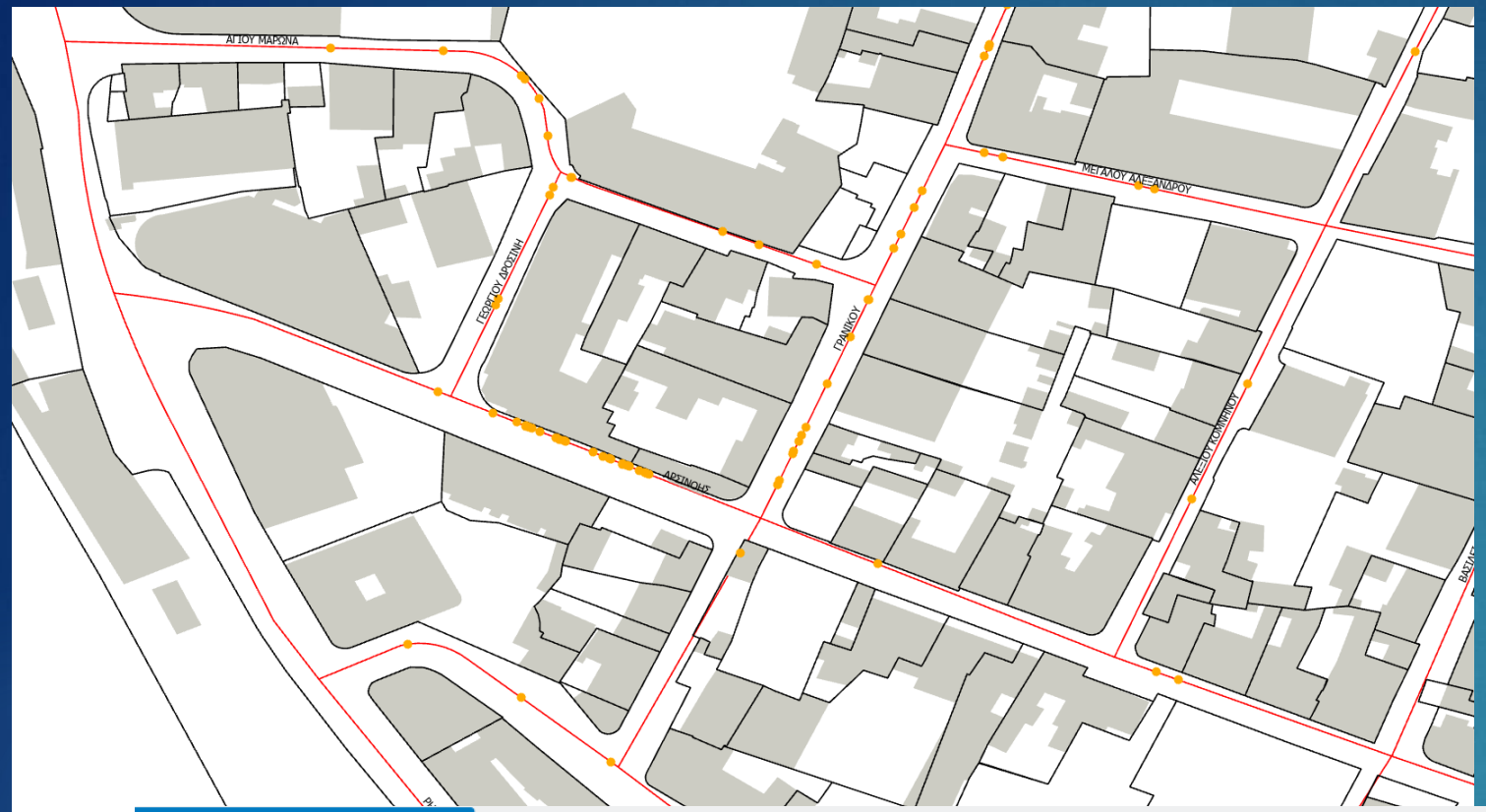
- Establish a central coordinating authority
- Implement common data standards and interoperability
- Define data owners and data custodian roles

Case – address system gaps

Key Challenges in the Address System - DLS

- dataset created by DLS (INSPIRE directive)
- spatial analysis of Parcels & Owner Addresses (DLS Land Information System)
- incomplete mapping
- cannot support reliable analysis (national or EU based), e.g. cannot be provided to Eurostat





Latest Pop Census, 2021:

1. Point location mismatch
2. Device accuracy
3. Limitations:

Enumerator recorded one point per housing unit in each block of apartment building resulting in multiple points
Implications: Inaccurate spatial data

Near_new_Grid_test_DLS_05072022

Near_new_Grid_test_DLS_05072022 - Map1

Select By Attributes | Zoom To | Switch | Clear | Delete | Copy

	FID	Shape *	EnumBlockC	StreetCode	HouseNr	FlatNr	QUARTER_CO	POSTCODE	StreetName	CYB_GeoPos	GEO_X	GEO_Y	NEAR_FID	NEAR_DIST	NEAR_X
6	5	Point	100000100	1000010006	14		100001	1010	Αγίου Μάρωνα	35.173353,33.358063	33.358063	35.173353	35959	1.229442	33.358111
7	6	Point	100000100	1000010006	16		100001	1010	Αγίου Μάρωνα	35.173373,33.358080	33.35808	35.173373	35959	1.472181	33.358113
8	7	Point	100000100	1000010006	18		100001	1010	Αγίου Μάρωνα	35.173342,33.358048	33.358048	35.173342	71584	0.805127	33.358081
9	8	Point	100000100	1000010006	7	101	100001	1010	Αγίου Μάρωνα	35.173648,33.357658	33.357658	35.173648	35959	6.95695	33.357697
10	9	Point	100000100	1000010006	8	101	100001	1010	Αγίου Μάρωνα	35.173865,33.357600	33.3576	35.173865	62222	23.933598	33.357545
11	10	Point	100000100	1000010014	13	101	100001	1010	Αλεξίου Κομνηνού	35.173053,33.359093	33.359093	35.173053	18140	14.281628	33.35928
12	11	Point	100000100	1000010014	29		100001	1010	Αλεξίου Κομνηνού	35.173583,33.359515	33.359515	35.173583	18140	1.117934	33.359568
13	12	Point	100000100	1000010014	35	101	100001	1010	Αλεξίου Κομνηνού	35.173680,33.359662	33.359662	35.17368	18140	7.044641	33.359632
14	13	Point	100000100	1000010014	35	201	100001	1010	Αλεξίου Κομνηνού	35.173800,33.359680	33.35968	35.1738	18140	3.387058	33.359687
15	14	Point	100000100	1000010014	7		100001	1010	Αλεξίου Κομνηνού	35.172812,33.359125	33.359125	35.172812	18140	1.621209	33.359183
16	15	Point	100000100	1000010020	34	101	100001	1010	Αρσινόης	35.172447,33.359048	33.359048	35.172447	49077	7.335247	33.359122
17	16	Point	100000100	1000010020	34	201	100001	1010	Αρσινόης	35.172330,33.359032	33.359032	35.17233	49077	19.818257	33.35916
18	17	Point	100000100	1000010020	4	101	100001	1010	Αρσινόης	35.173518,33.358080	33.35808	35.173518	35959	6.286467	33.358057
19	18	Point	100000100	1000010020	4	102	100001	1010	Αρσινόης	35.172952,33.358147	33.358147	35.172952	49077	8.008407	33.35815

The power of geospatial data

Why Geospatial Data Matters:

- Enhancing Decisions and Impacting Everything — From Policy to Disaster Response

- Urban Planning

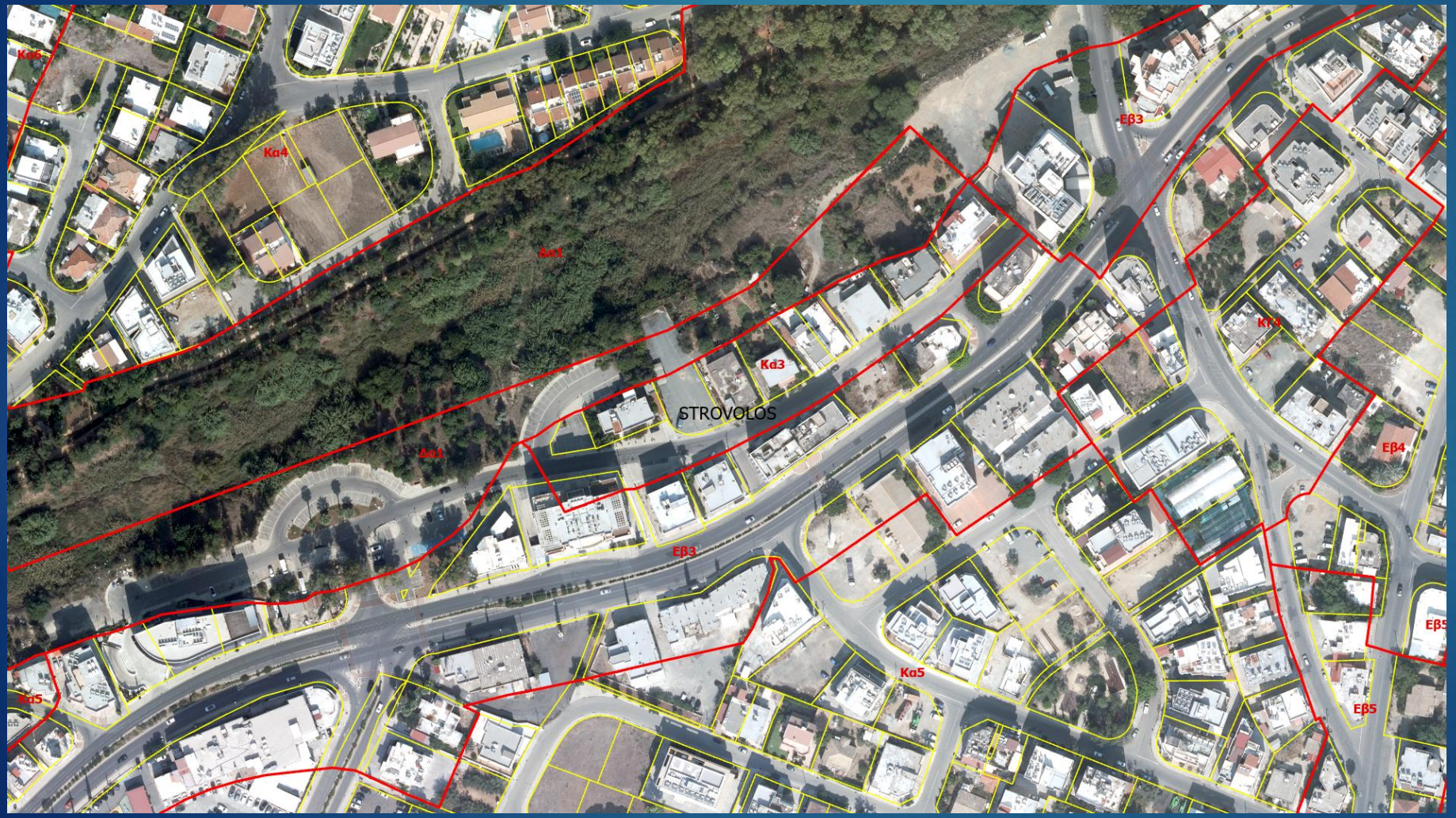
Ensures accurate land-use & zoning data to support sustainable development

- Emergency Response / Environmental Monitoring

Enables rapid decision-making during crises

- European Reporting (INSPIRE, Eurostat-GISCO, UN-GGIM)

Planning zones map



Orthoimagery &
& parcels & Planning
zone polygons

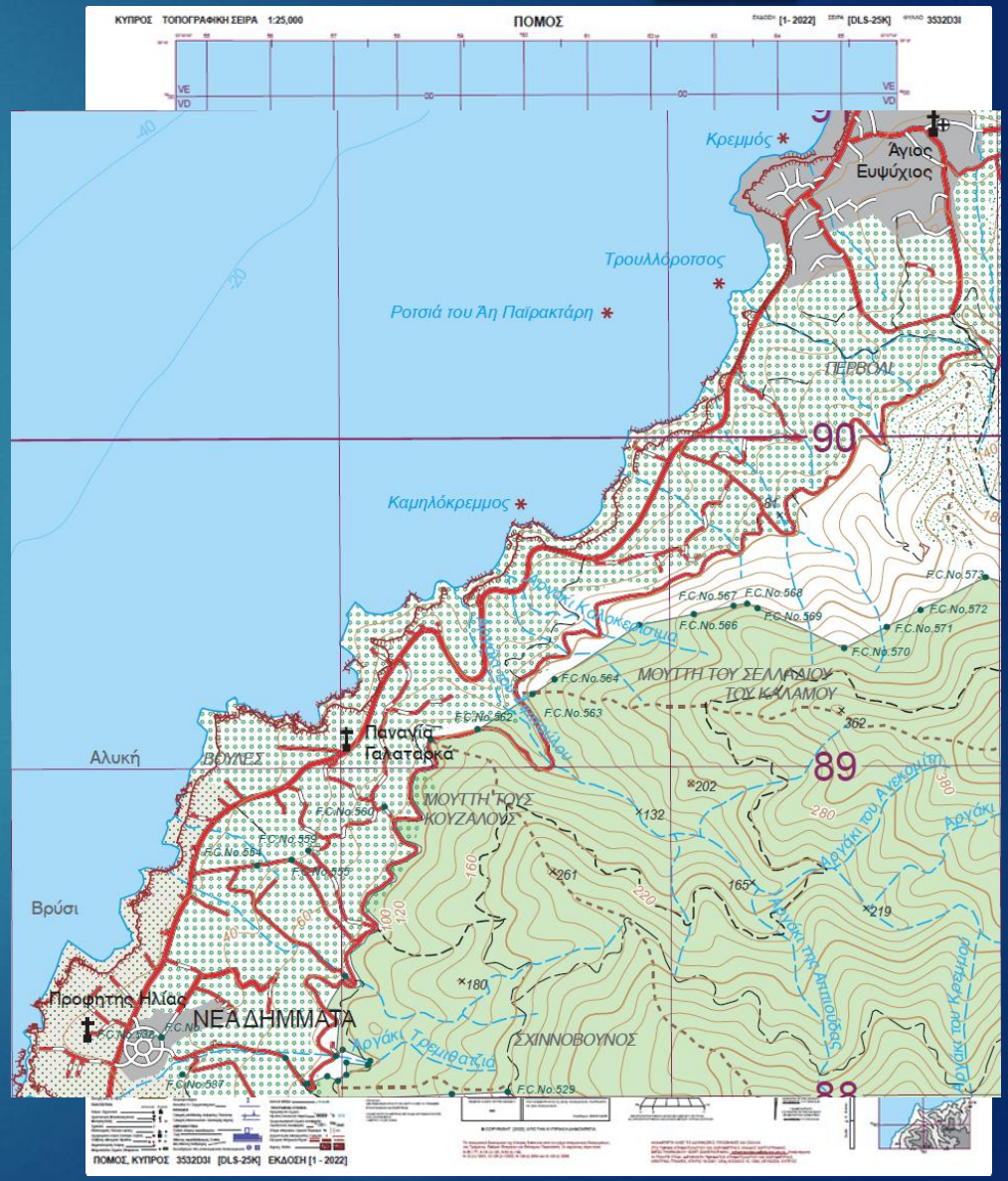
The power of geospatial data

Why Geospatial Data Matters:

- Enhancing Map Quality and Products

- **Accurate & Up-to-Date Data**
  ensures reliable, user-friendly maps
- **Precision**
  Meter-level accuracy, using tools such as ArcGIS Pro
- **Modern, user-focused map products**
  meeting today's standards and user expectations
- **Better Decisions**
  Supporting evidence-based planning

  for national stakeholders (government ministries, municipalities)



EU Requirements for Geospatial Data

- Eurostat requires high-quality, authoritative data for geospatial reference datasets (via GISCO)
- Sourced from official agencies
- With full metadata and documentation
- Updated and versioned for reliability

- Administrative Boundaries → Provided by DLS to Eurostat
  ✅ **Core dataset** for EU geospatial and statistical systems
- Accuracy ensured by cadastral data
- Continuously updated and maintained
- Local Government Reform – New Coding System underway…

EU Requirements for Geospatial Data
The Administrative Data Case

Updating Eurostat/Eurogeographics'/INSPIRE dataset after the local government reform

Step 1: Local Government Reform

- Mergers of existing entities
- Creation of new entities

⬇️

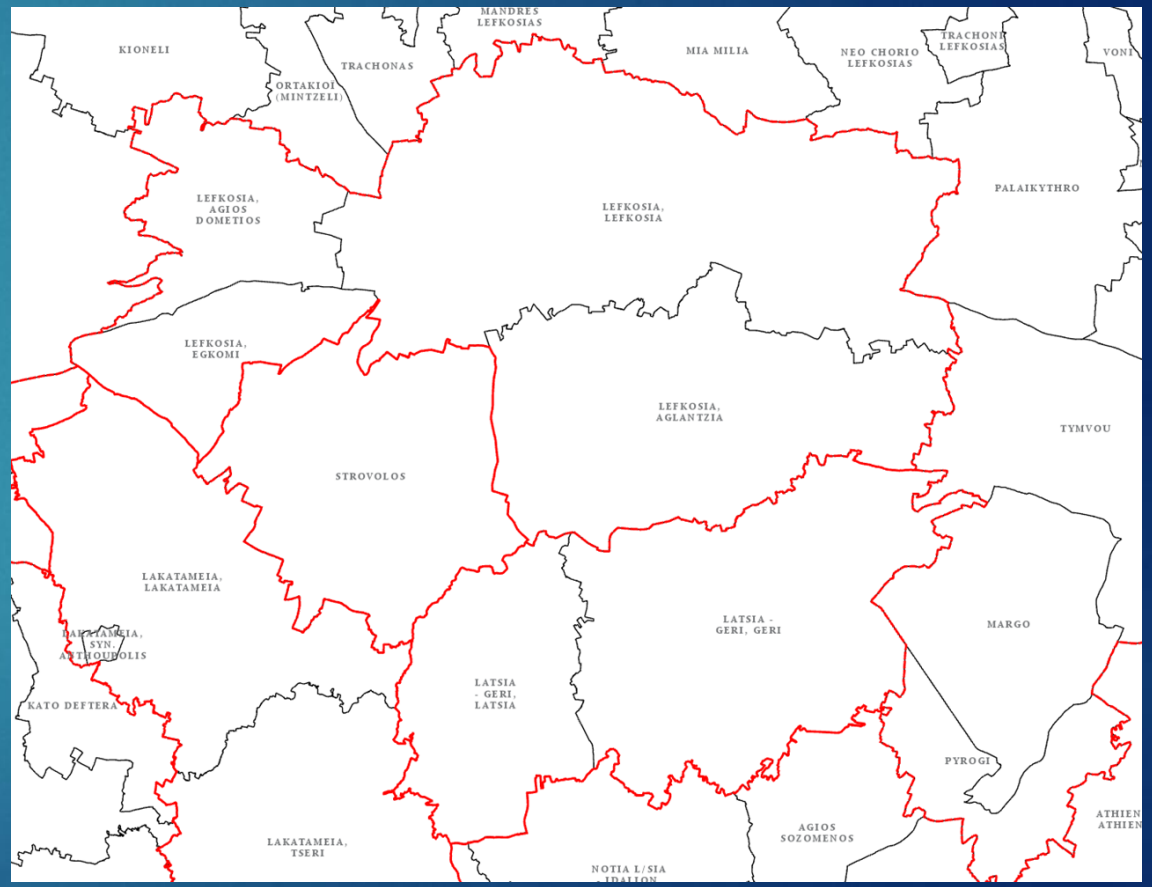
Step 2: Agree on New Geographic Codes

- Establish a national coding system for all units

⬇️

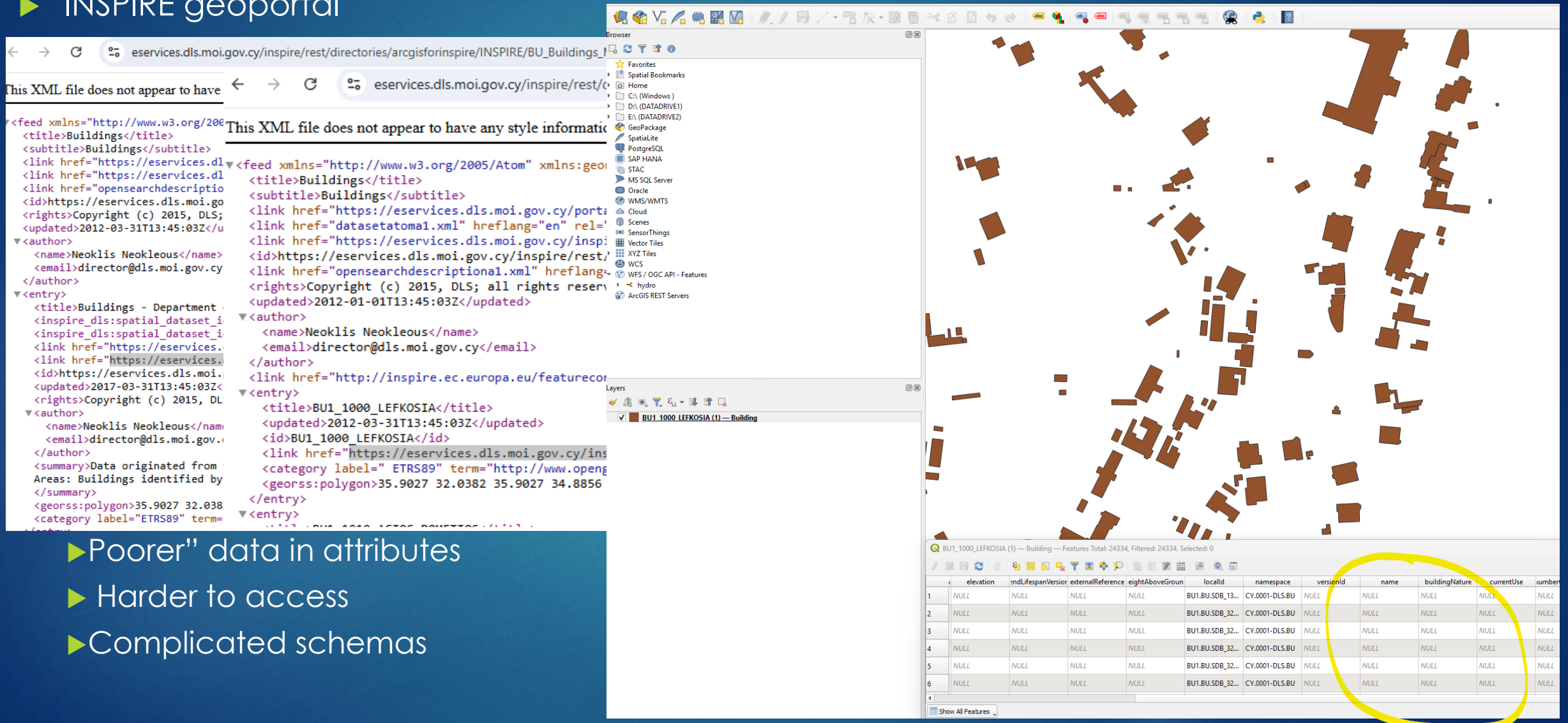
Step 3: Update Eurostat / Eurogeographics' dbs

- Reflect the new administrative structure



INSPIRE
HVD…..

- INSPIRE geoportal



- Poorer" data in attributes
- Harder to access
- Complicated schemas

Key Takeaways

- Data quality ensures reliable information
- Data usability makes the information actionable
- DLS progresses through collaborative effort, strengthening data ownership, inspiring innovation, regular user feedback.
- Impact felt locally and across European policy frameworks

THANK YOU
FOR YOUR ATTENTION

ANY QUESTIONS

DEPARTMENT OF LANDS AND SURVEYS

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