Converting DWG to Geospatial data

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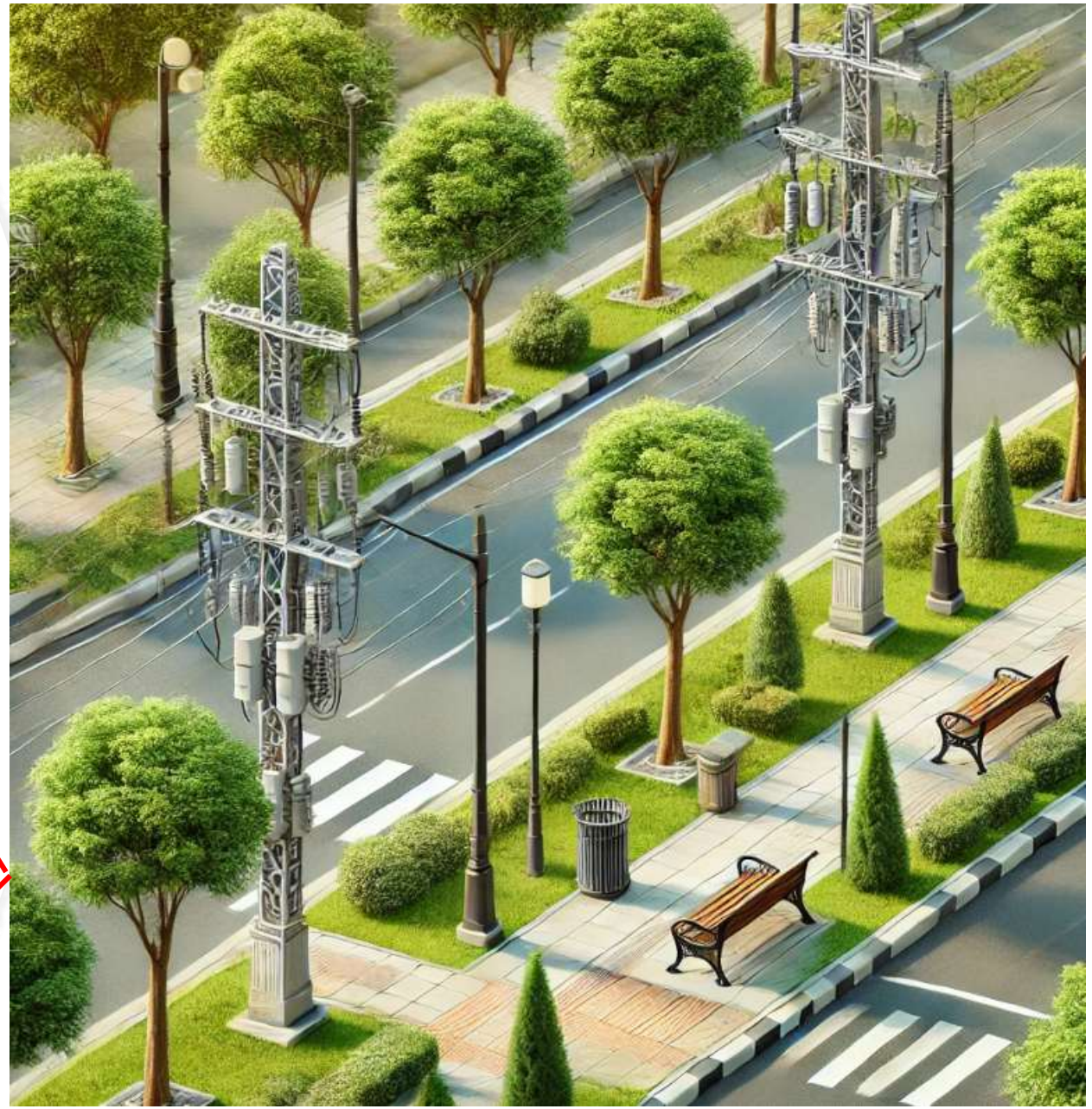
What?

As-Made (DWG) files are the most used data among surveyors in Israel



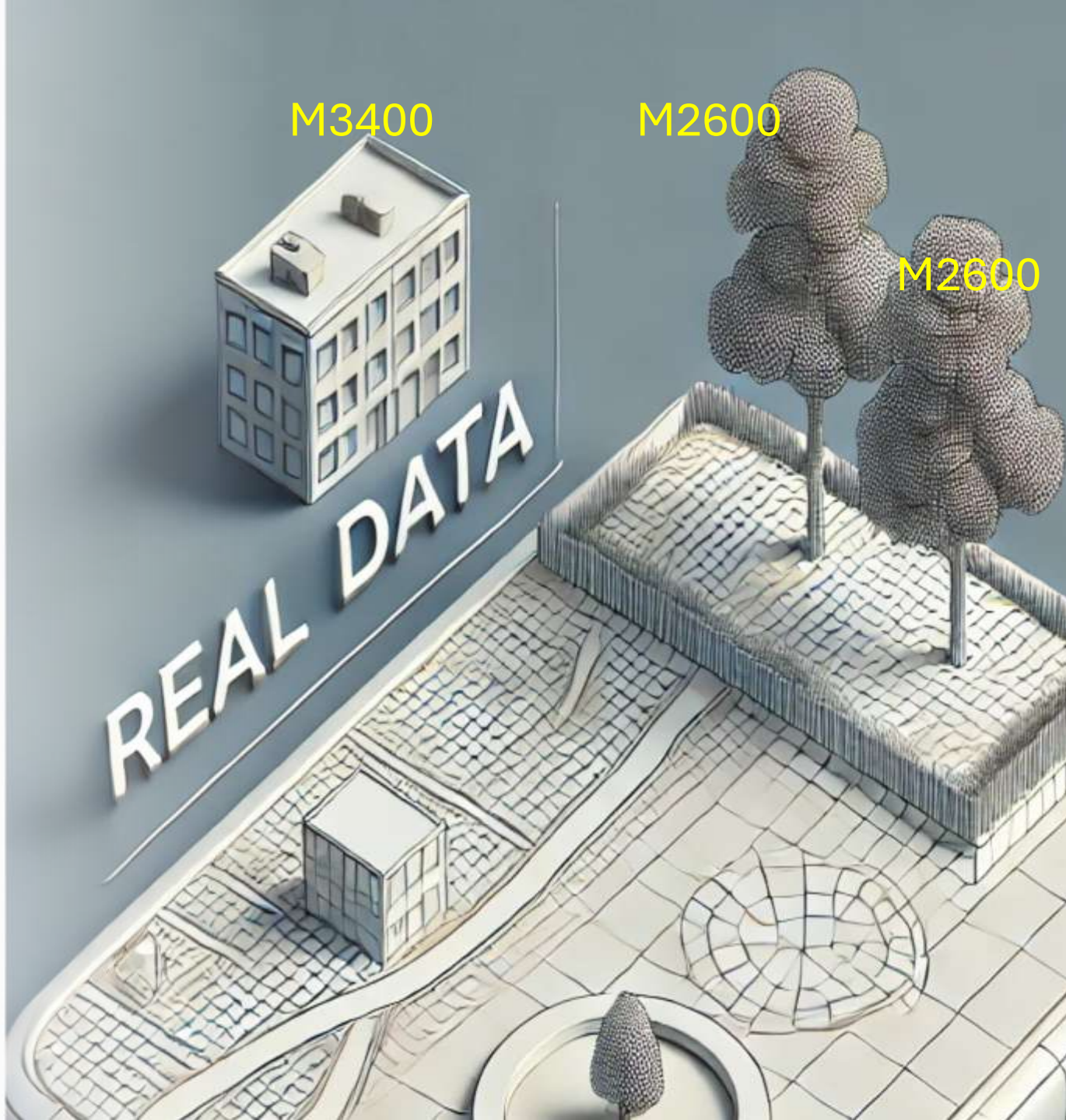
Today?

Survey data is often discarded after it fulfills its intended purpose, leading to potential loss of valuable information.

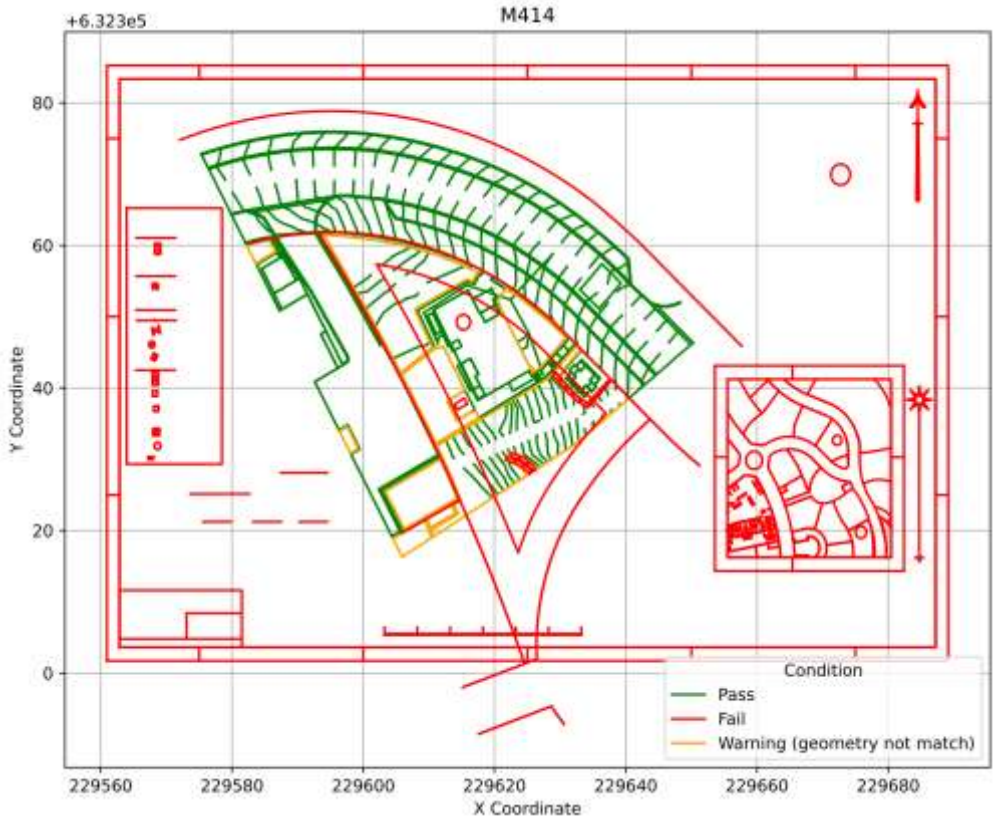
Why?

Extracting data from drawings is inefficient, even when layers follow agreed-upon specifications and layer names

	A	B	C	D	E	F	G	H
1	LAYER	GEOMETR	BLOCK_NAM	LAYER	BLOCK_NAM	FC	ERROR	NOTES
2	M4600	POINT	M4600_E			M46_NOTE		תיאור
3	M4601	POLYLINE		M4601	M4601_A	M46_PIPE		קו עילי
4	M4601	POINT	M4601_P			M46_GROUND		
5	M4602	POLYLINE		M4602	M4602_A	M46_PIPE_UNDERGROUND		קו תתק
6	M4602	POINT	M4602_P			M46_GROUND		
7	M4609	POINT	M4609_E			M46_WATER_TAP		מגוף
8	M4609	POINT	M4609			M46_WATER_TAP		מגוף
9	M4610	POINT	M4610_E			M46_WATER_METER		שעון
10	M4610	POINT	M4610			M46_WATER_METER		שעון
11	M4611	POINT	M4611_E			M46_HYDRANT		הידרנט
12	M4613	POINT	M4613_P			M46_GROUND		באר
13	M4613	POINT	M4613_E			M46_WELL_P		
14	M4613	POLYGON	M4613_S			M46_WELL		
15	M4613	POINT	M4613			M46_WELL_P		
16	M4614	POINT	M4614_E			M46_CONECTOR		חיבור מקוחת
17	M4614	POINT	M4614			M46_CONECTOR		חיבור מקורות
18	M4615	POINT	M4615_P			M46_GROUND		שוחת גוב מים

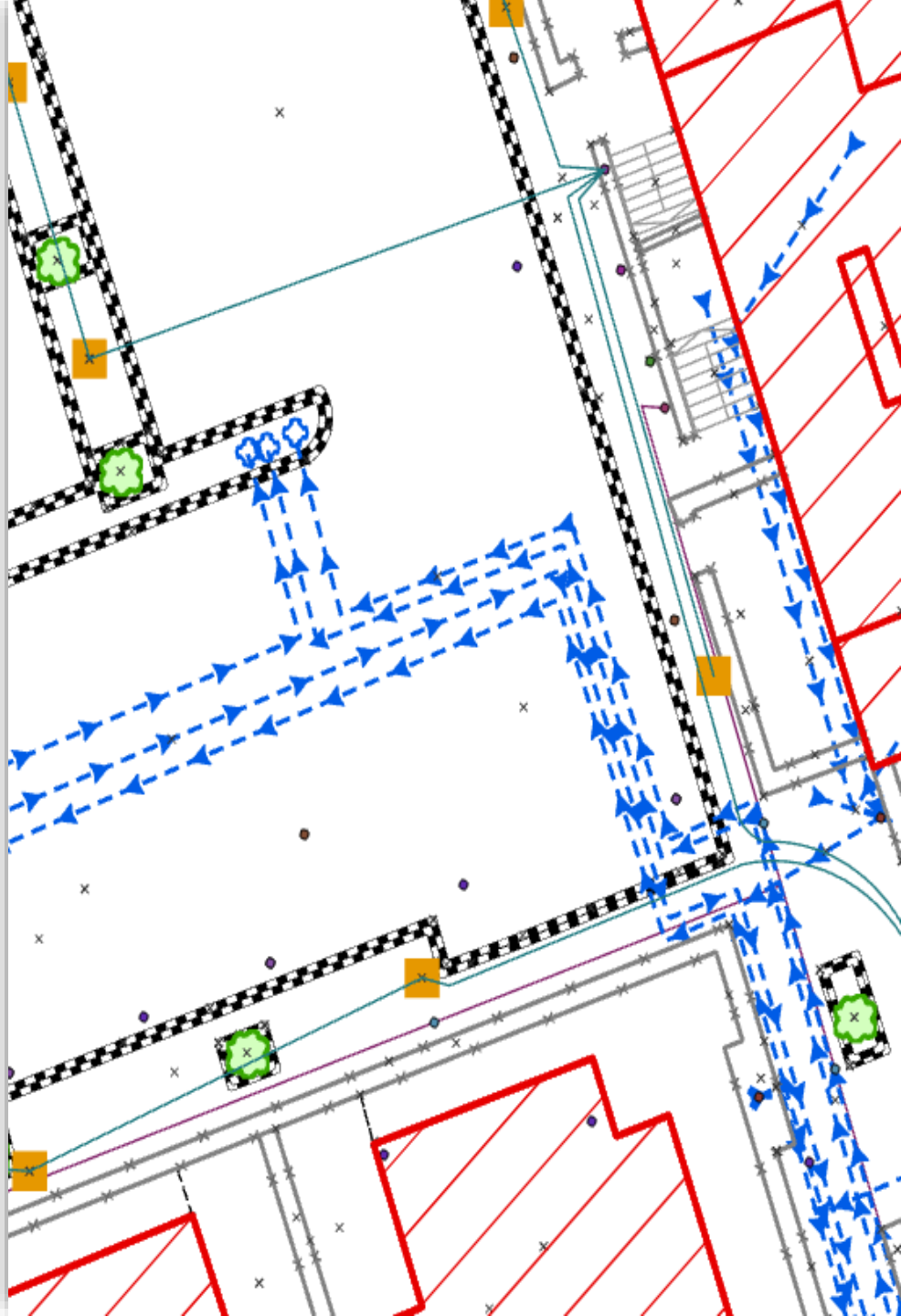


How?

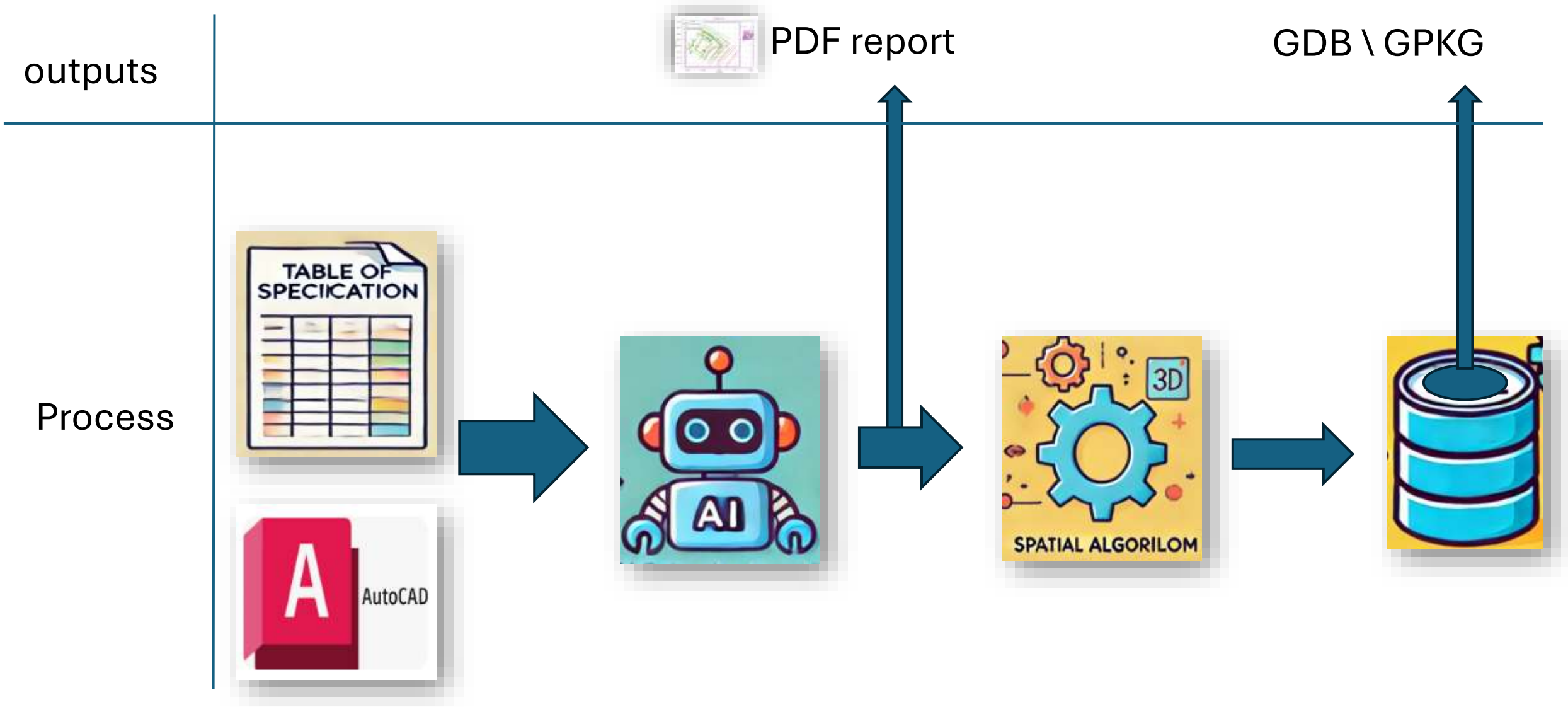

M414
+6.323e5
Y Coordinate
X Coordinate
80
60
40
20
0
229560
229580
229600
229620
229640
229660
229680
Condition
Pass
Fail
Warning (geometry not match)

SmartCAD

- No need QGIS and ArcPro
- Converting DWG to GIS by Given Specification
- Connecting Data from Blocks to Layers
- Removing Graphic Layers
- Closing Polylines to Polygons (If Possible)
- Building a Continuous Database from Multiple Files
- Creating a DEM
- Ensure All Lines Start from Highest Point
- And More



Tool activity



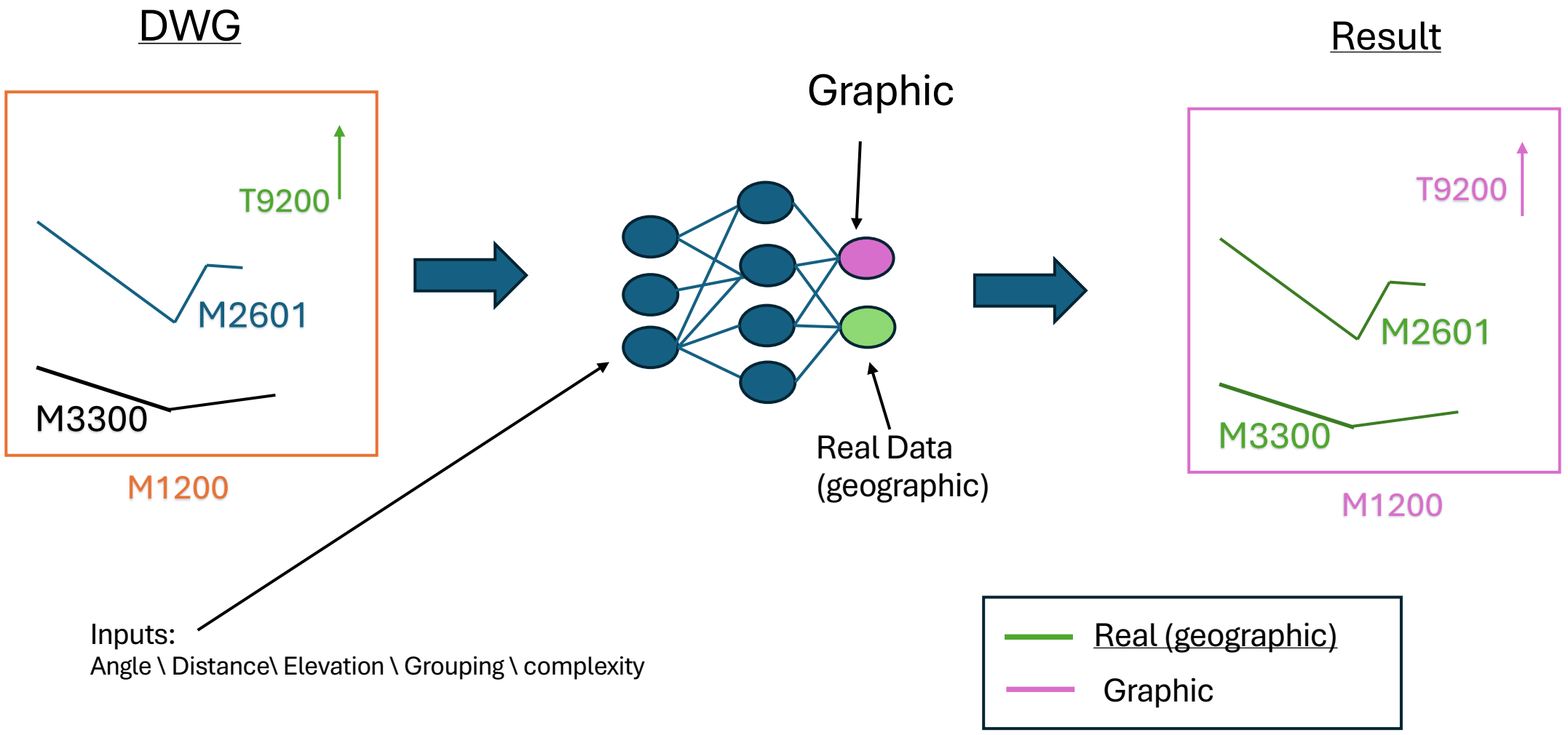
Explained

Check angle in polyline vertices
Distance from frame
Elevation Irregularities
Grouping of vortexes(KNN)
Shape complexity

Layer	Angle	Distance	Elevation	Grouping	complexity	isGeom
TREE	0	0.11	0.02	0.77	0.45	True
BUILDING	1	0.21	0	0.01	0.2	False
WALL	1	0.21	0.18	0.92	0.9	False
WALL	0	0.7	0.02	0.8	0.1	True

* Normalized values

Stage 1 – remove graphic layer



Stage 2 – compare with format

Format

Layer Code	Layer name
M2601	Pipeline
M1200	Frame
99000	wall

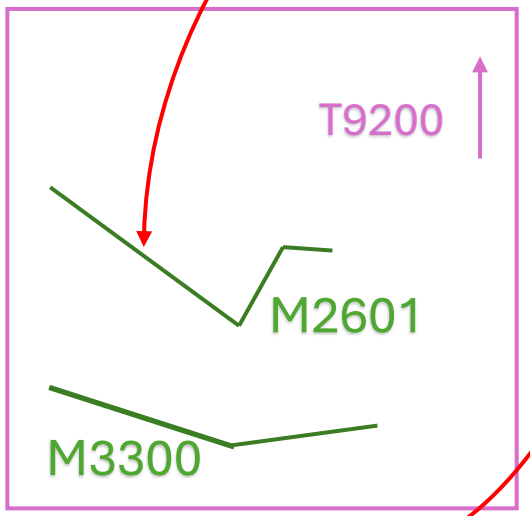
Format + real

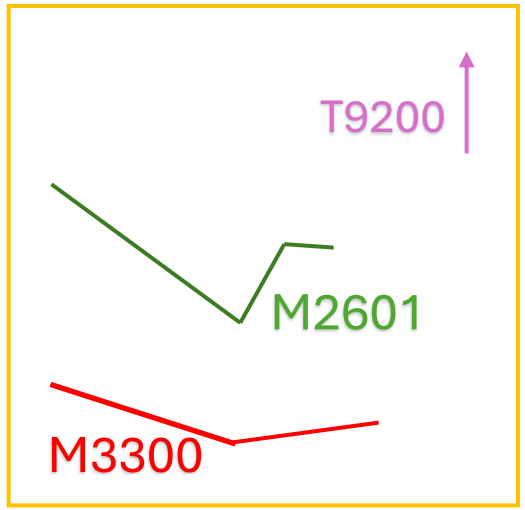
Not in Format + real

Not in Format + Not real

Format + Not real

Result (graphic \ real)

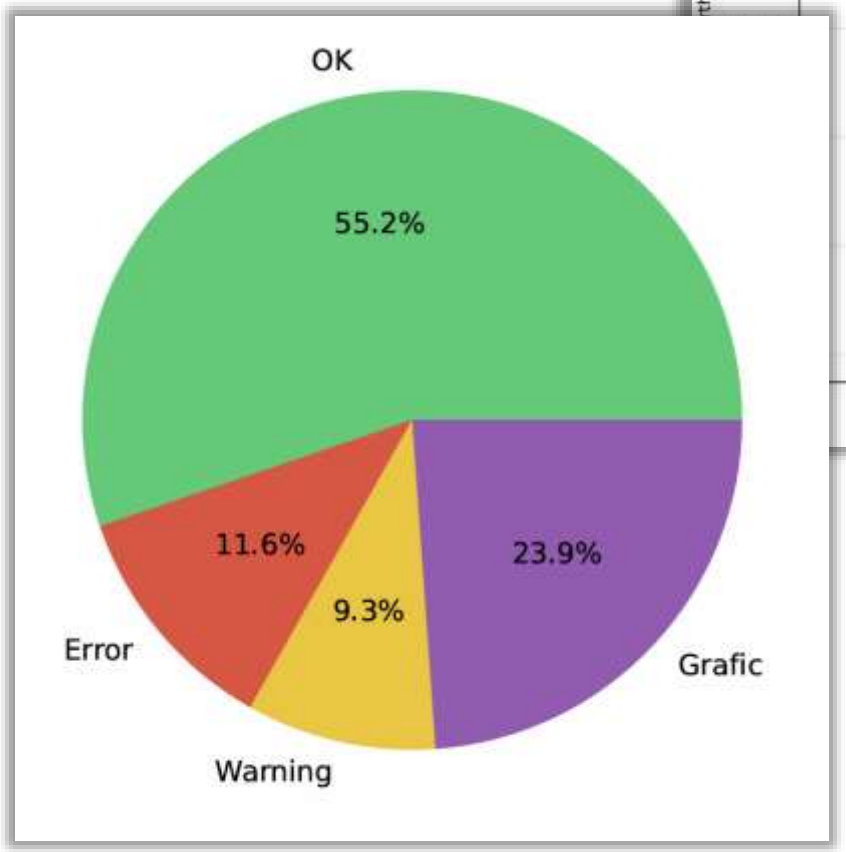


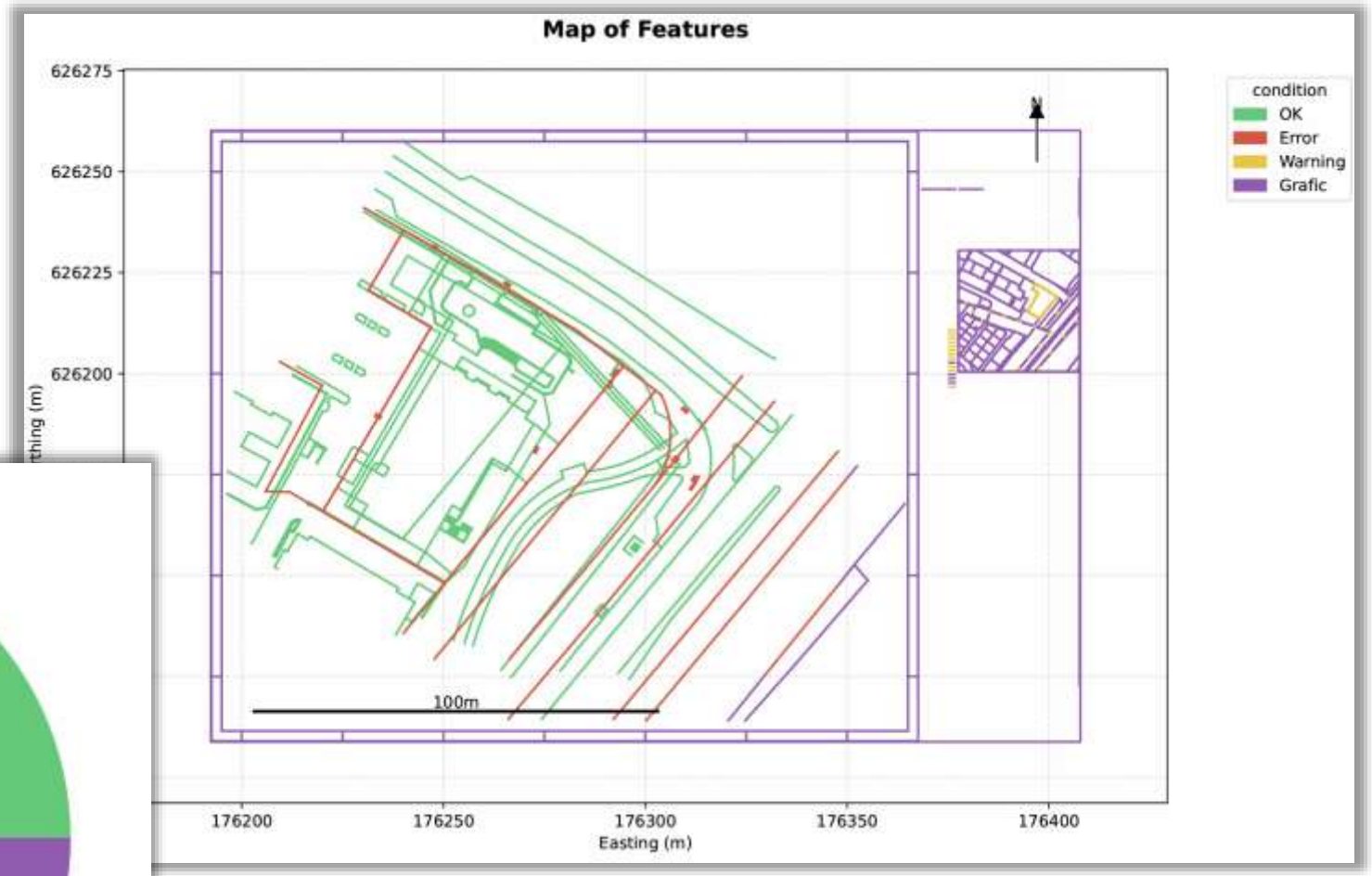


	Found as Graphic (AI)	Found as Real (AI)
In format	Not passing to Database	Pass to Database
Not in format	Not passing to Database	Not passing to Database

Result

Report – Layers based on MAVAT specifications.





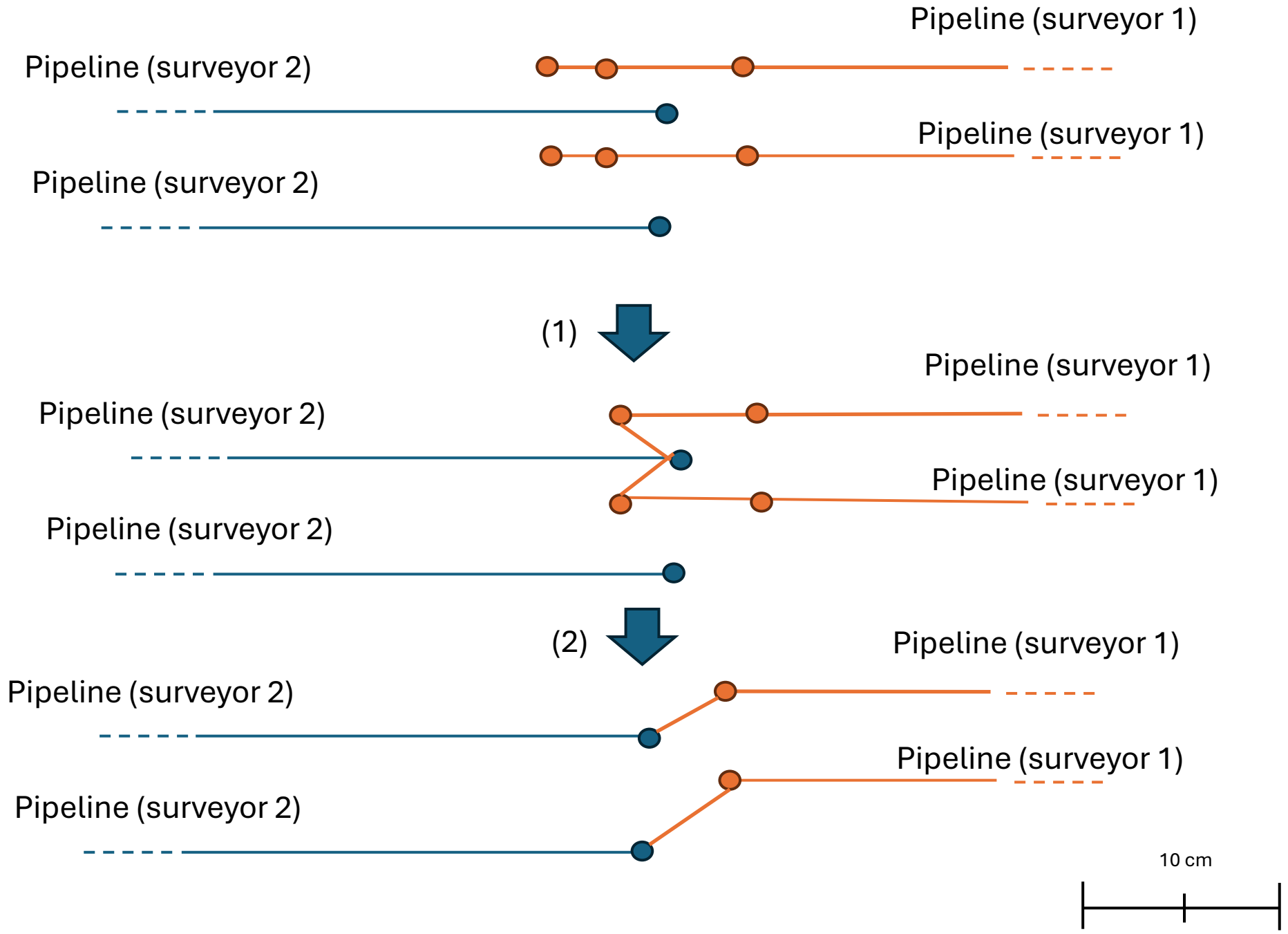
Update database automatically

So how do we do it?

1) Checking the closest vertices from similar type

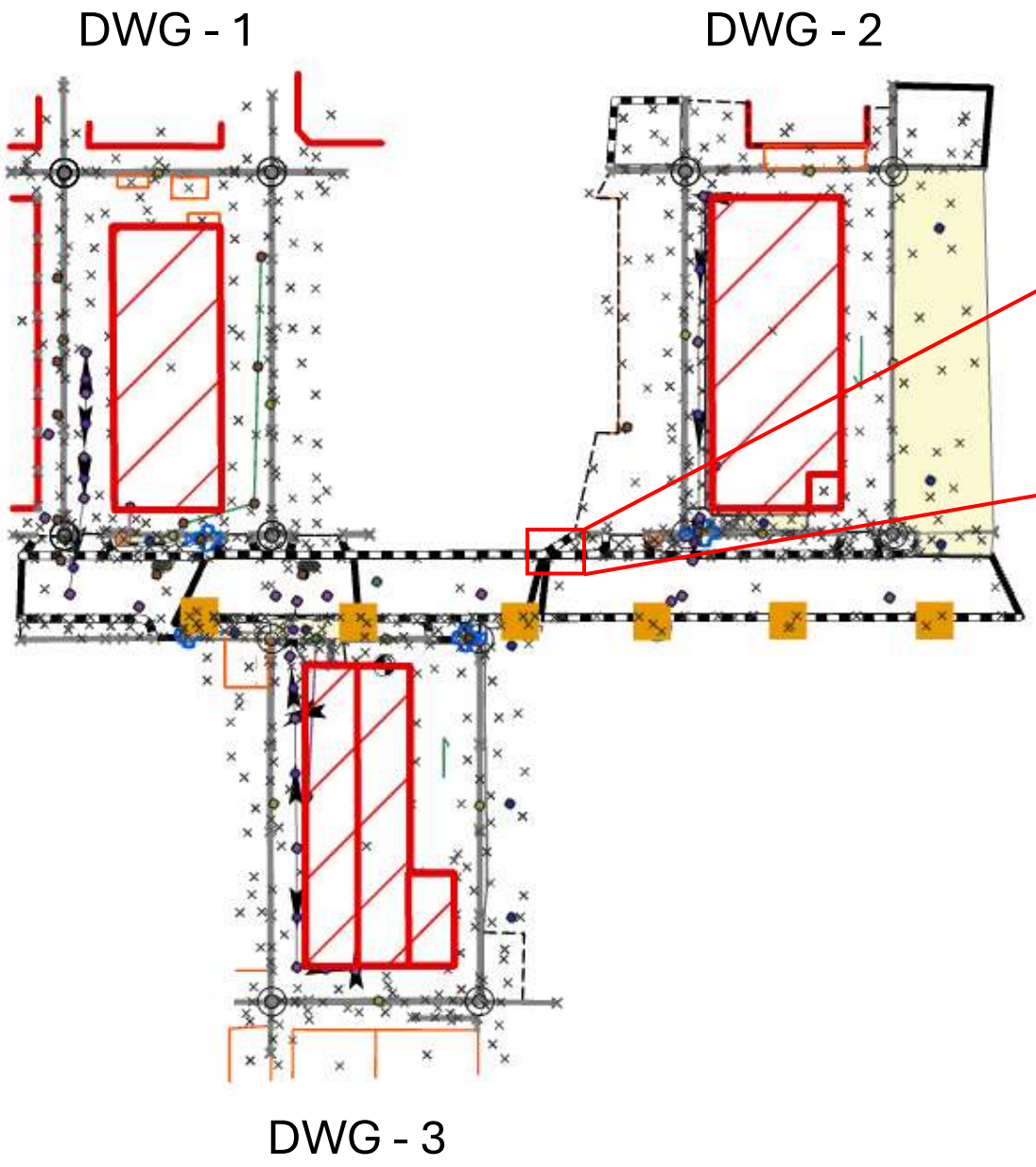
2) Only 1 connection between nodes are allowed

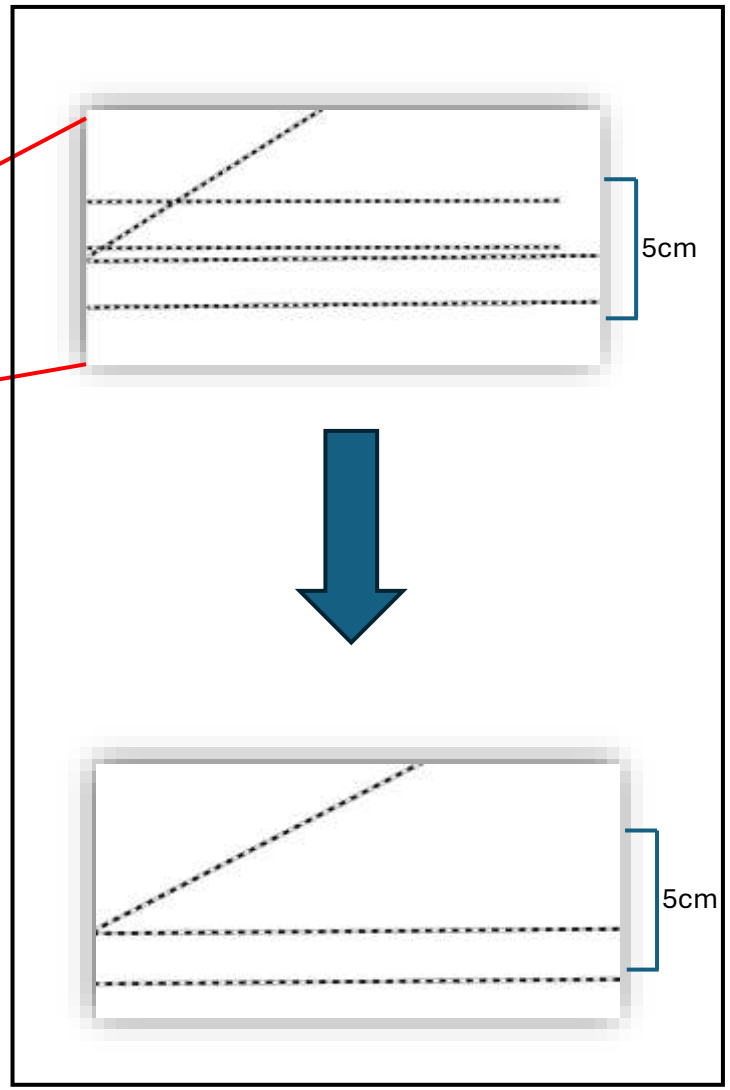
3) Checking angel of vertices before, if angel changed to much, deleted



Example

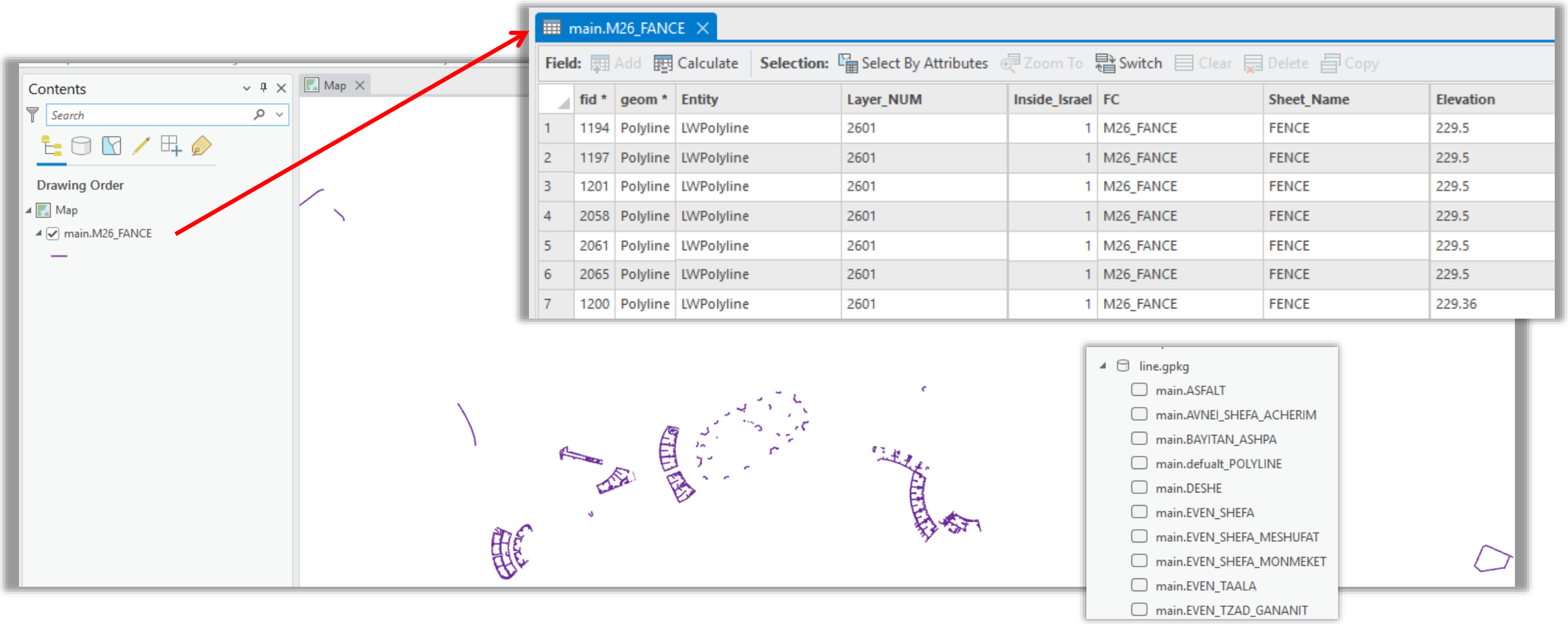
After extracting the DWG layers into geographical layers, a following algorithm will be activated to integrate data from various surveyors into a unified, continuous database.





Database result -

All your layers from DWG, with only the relevant columns in 1 continuous Database.



Thanks for listening...

For more GeomAI work:

ArcPro + ChatGPT
https://www.youtube.com/watch?v=pF17FTzHR68&t=197s

Nnetwork analysis:
https://www.youtube.com/watch?v=zfWg2aXYZV0

web:
https://gisdocs.netlify.app/

Linkedin:

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