

GIS Application within Archaeological Cadastral System

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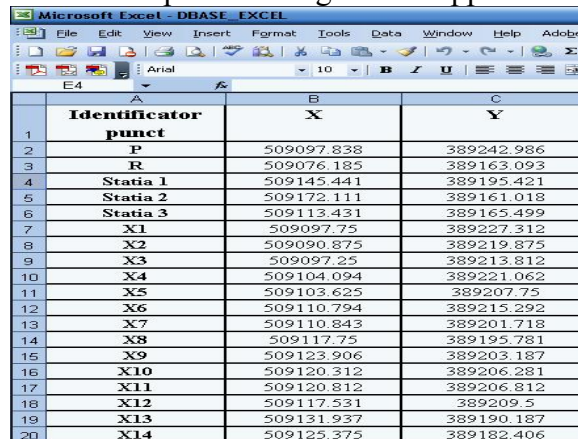
Summary: Creating a base of archaeological data for identified, discharged or not, and capitalized sites, for the areas suspected to bear archaeological marks on lands within public or private property and therefore, today, requires a special care regarding first of all the location with precision of the site, creating the accesses to the site, defining the safety and protection areas, and finally but not least the position of the grids for excavations, excavations time schedule, and age identification of the heritage. This paper is presented to draw attention on the pure archaeological cadastral issues to which are added the archaeological GIS elements.

1. Data sources

The Topographical and Geodesic data for locating the archaeological sites are individualized in the Projection and Reference Stereographic 1970, through modern technology. The position of the points that form the data base for the development of the map are materialized on site by positioning systems with GPS satellites and subsequently by the total stations. Then, they are discharged and processed by a specialized soft and put in pre-defined formats dependant on the application in which the data are processed on. Also, the data can come from older work in which are kept the coordinate inventory either digitally or analogical or based on some plans or maps in an analogical format which subsequently will be scanned, referenced and vector formed.

2. Compatibilities between Microsoft Excel and GIS applications

A topographical data file can be opened through Excel application:



	A	B	C
	Identificator punct	X	Y
1	P	509097.838	389242.986
2	R	509076.185	389163.093
3	Statia 1	509145.441	389195.421
4	Statia 2	509172.111	389161.018
5	Statia 3	509113.431	389165.499
6	X1	509097.75	389227.312
7	X2	509090.875	389219.875
8	X3	509097.25	389213.812
9	X4	509104.094	389221.062
10	X5	509103.625	389207.75
11	X6	509110.794	389215.292
12	X7	509110.843	389201.718
13	X8	509117.75	389195.781
14	X9	509123.906	389203.187
15	X10	509120.312	389206.281
16	X11	509120.812	389206.812
17	X12	509117.531	389209.5
18	X13	509131.937	389190.187
19	X14	509125.375	389182.406
20			

Figure.1

The columns are defined as follows: click in the superior part of the column (the elements are marked) → click right → Format cells → and choose the options presented in the image below → then press OK. The operation repeats itself for the other columns. It is saved under the format DBF4 (dBASE IV) – format compatible with Arc VIEW).

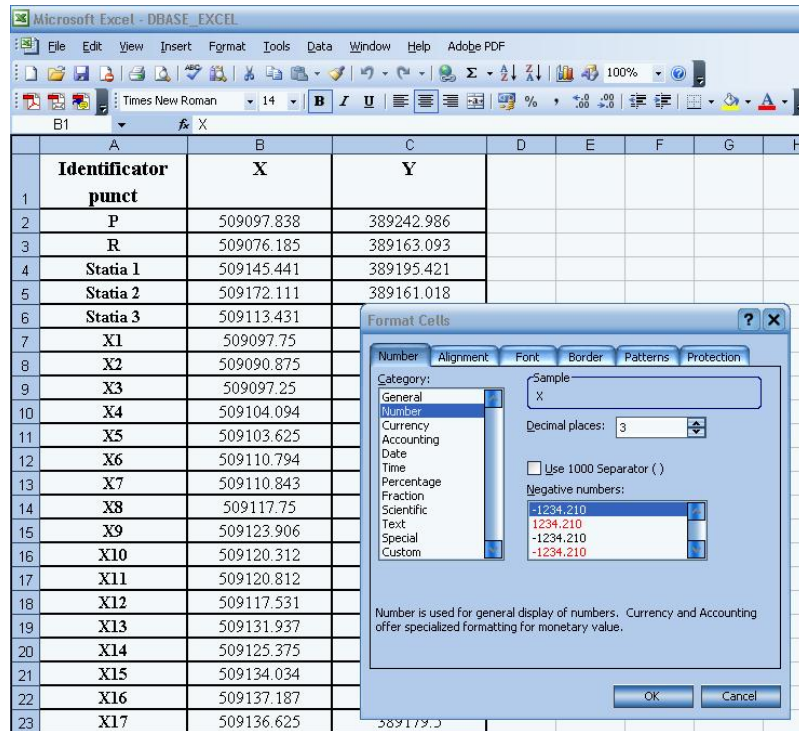


Figure.2

3. Defining the projection system and points positioning

The points are positioned within an application by opening Arc View, Add Data, select the file, and then press Add. By defining the projection the following steps are taken: (edit → select → Romania – predefined file after the parameters of the topographical projection → Projected → Stereo 70.prj→add.

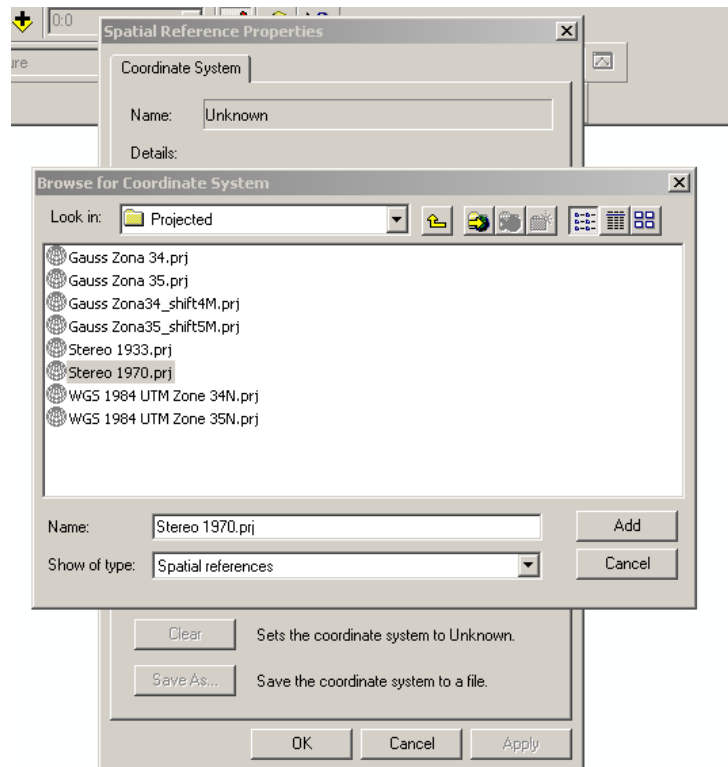


Figure. 3

Then the points are positioned and will help editing the map or the plan.

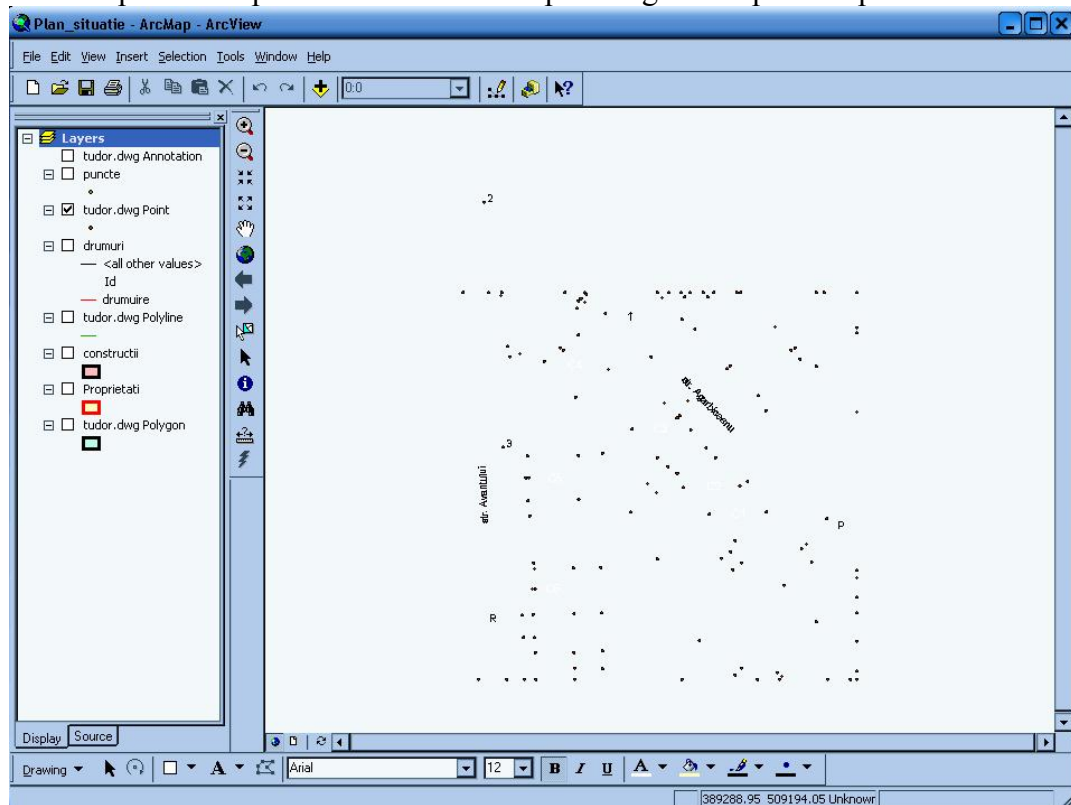
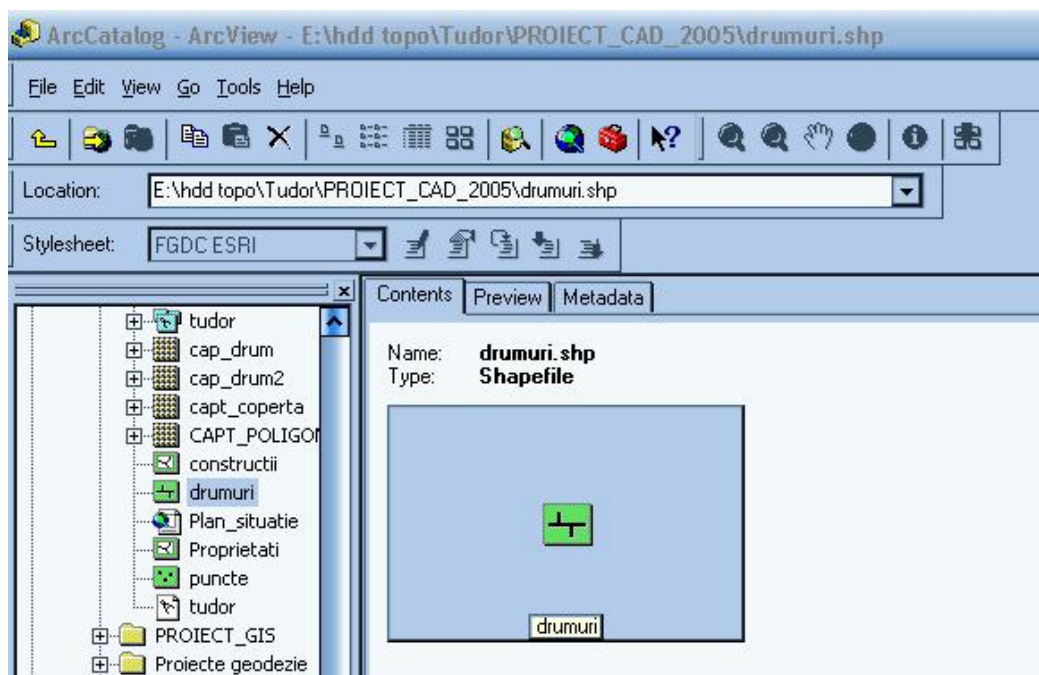


Figure. 4

4. Creating the files of type *.shp (shape) in Arc Catalog

The designing (shapefile, dBase table) is done in ArcCatalog.

Creating a shapefile : click right topo data → new → dBase Table; the table is defined with properties; click right → properties



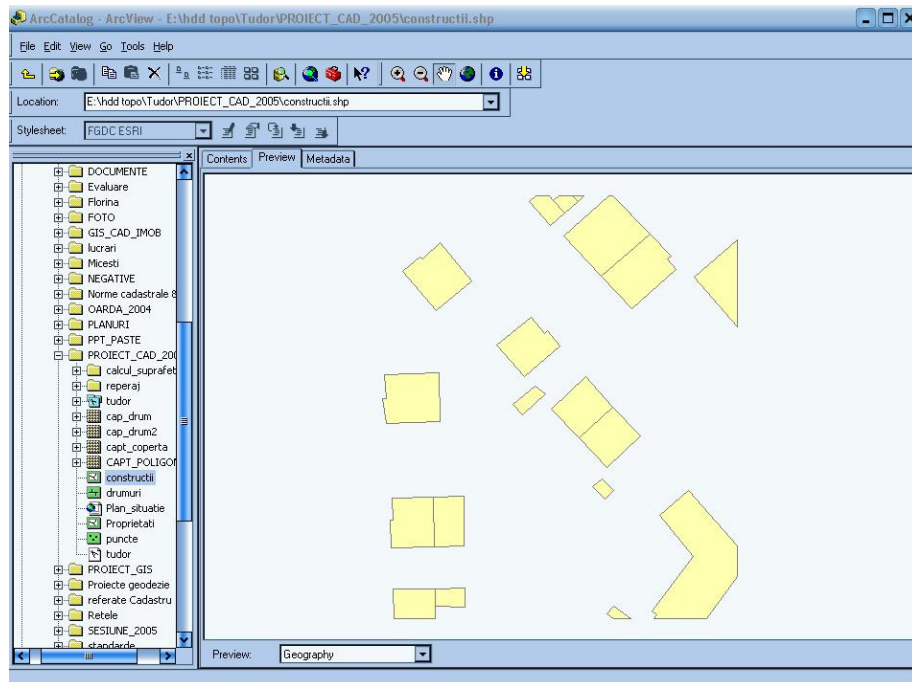


Figure.5

In order to view the data from the tables contained in the selected article you use the ArcCatalog application. You choose Table from the list within Preview tag. The columns and the rows of the table and the value for each cell are showed.

ArcCatalog - ArcView - E:\hdd topo\Tudor\PROIECT_CAD_2005\constructii.shp

File Edit View Go Tools Help

Location: E:\hdd topo\Tudor\PROIECT_CAD_2005\constructii.shp

Stylesheet: FGDC ESRI

Contents Preview Metadata

FID	Shape*	Id	TIP
0	Polygon ZM	0	
1	Polygon ZM	0	
2	Polygon ZM	0	
3	Polygon ZM	0	
4	Polygon ZM	0	
5	Polygon ZM	0	
6	Polygon ZM	0	
7	Polygon ZM	0	
8	Polygon ZM	0	
9	Polygon ZM	0	
10	Polygon ZM	0	
11	Polygon ZM	0	
12	Polygon ZM	0	
13	Polygon ZM	0	
14	Polygon ZM	0	
15	Polygon ZM	0	
16	Polygon ZM	0	
17	Polygon ZM	0	
18	Polygon ZM	0	

Figure. 6

5. Drawing the plan in Arc Map and creating the data base

1. You open ArcMap→Add→Data→Tudor→Tudor.dwg Point
2. The file is brought in the data frame of the project (Tudor)
3. You create the shapefile – drumuri (roads)
4. You bring in the project the Shapefiles predefined in Arc Catalog dependant on the layers that we wish to be represented– drumuri (roads), construcții (buildings), proprietăți (properties) – the procedure is the one presented within the properties tables)
5. You edit the data base on layers:
Drumuri – you open the SHAPE table → from the instruments bar EDITOR you select Start Editing→ you select the folder where you wish to edit → then press OK
6. You select SKETCH TOOL (creionul)→ TASK – Auto complete polygon→ Target – the shape in which you work.
7. You join the points that form the contour of the buildings by obtaining a polygon→ and in the properties table you fill in the data base. The operation is performed for each building and you save the edit - Save Edits. Similarly is done for the roads and property layers.

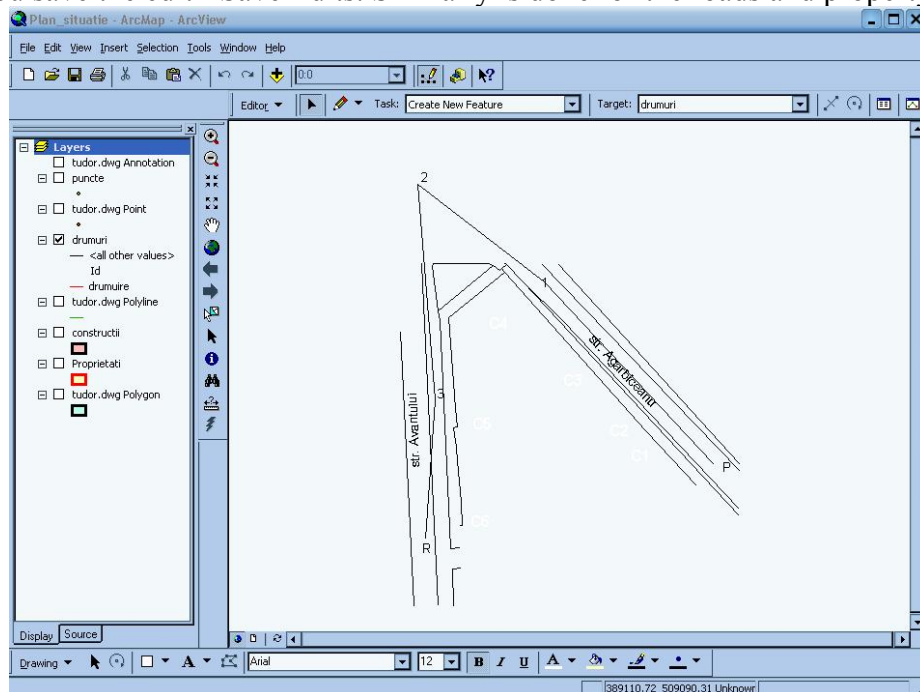


Figure. 7

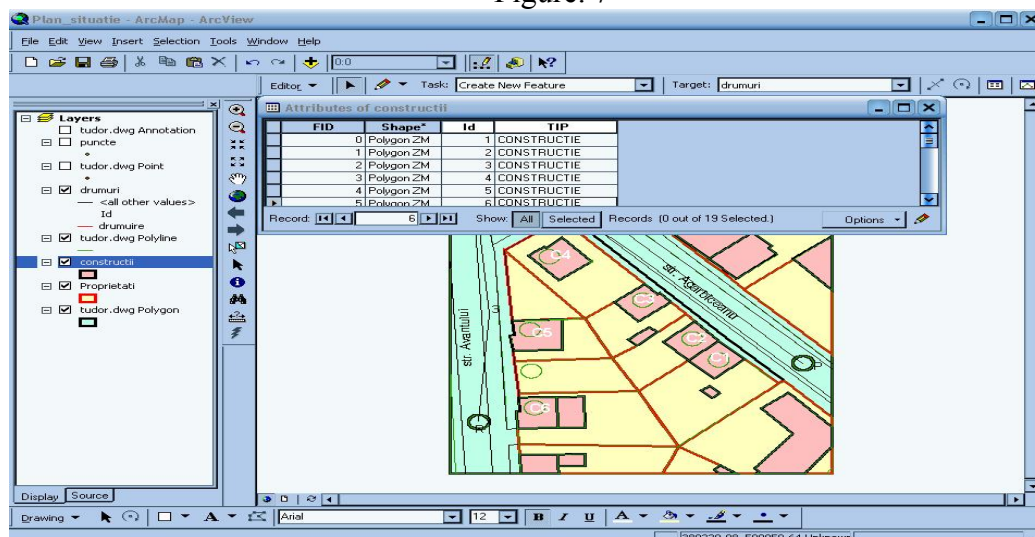


Figure. 8

6. Making the links

You activate from the menu bar the command Identify → you put the cursor on the entity to which you want to create the link.

You make click left within the area. Then right click on the identification number and you choose the command Add Hyperlink. After you identify the folder in which you find the file you searched, you make click on OK and from that point on you establish the link within the program.

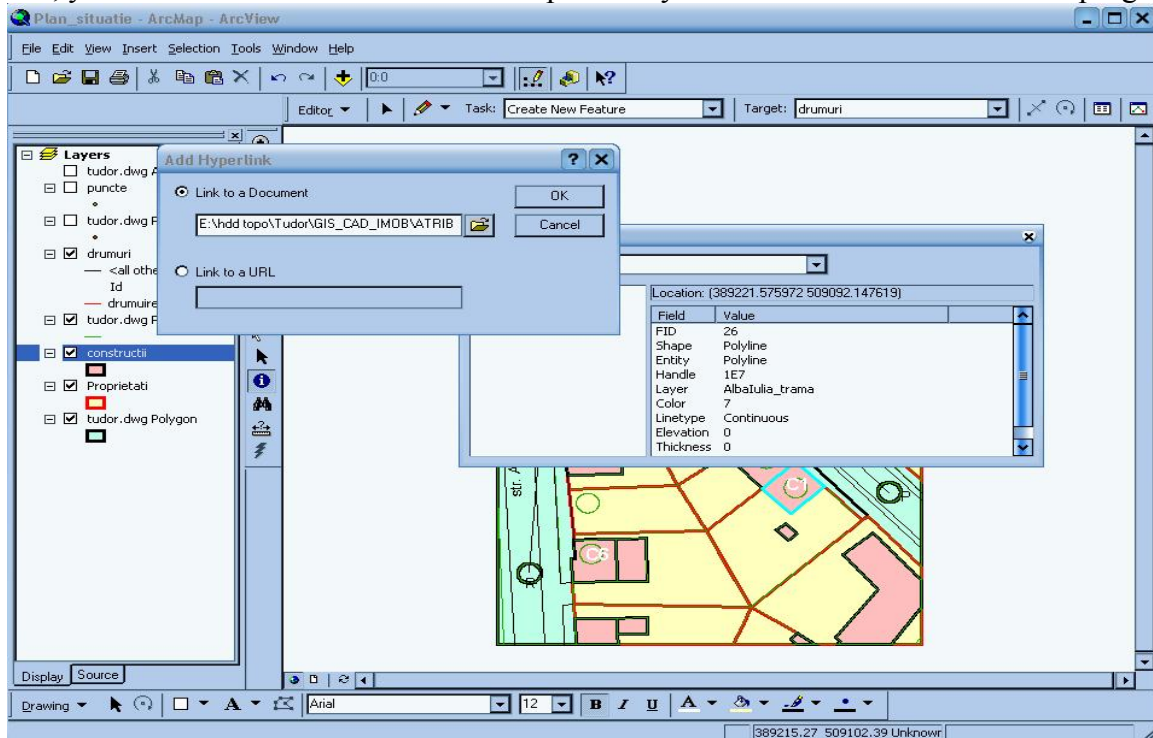


Figure. 9

7. Definition Query

Make right click on the shapefile CONSTRUCȚII → Properties→Symbology

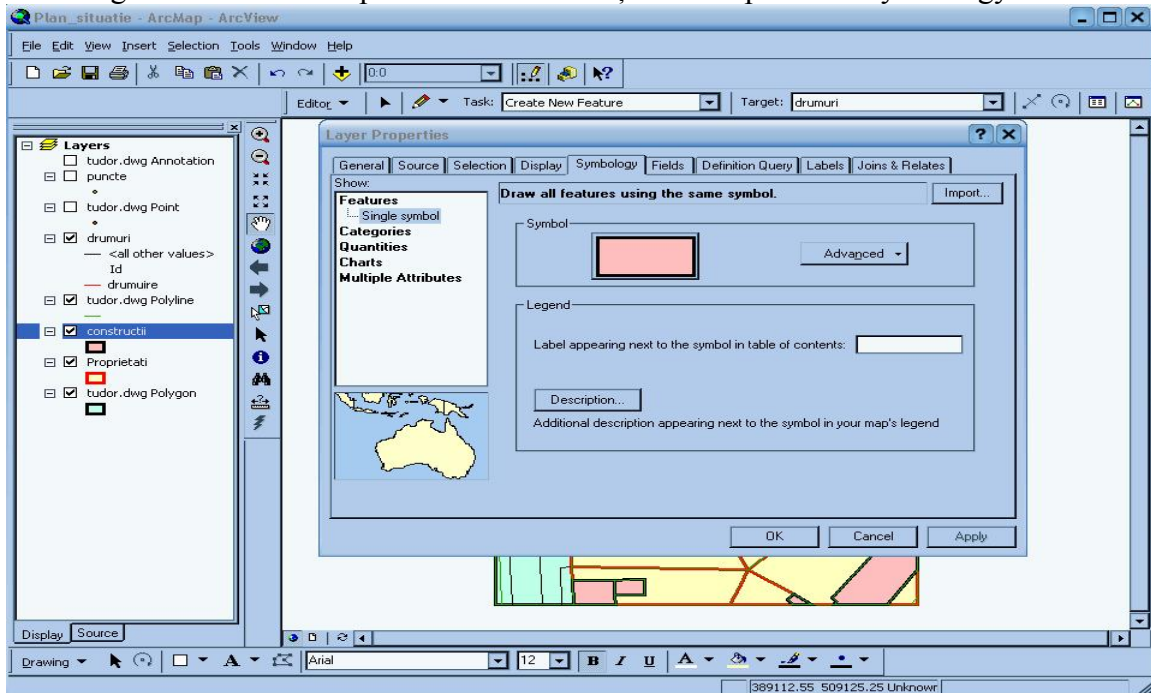


Figure. 10

Click right on the shapefile CONSTRUCTII → Properties→ Definition Query → Query Builder

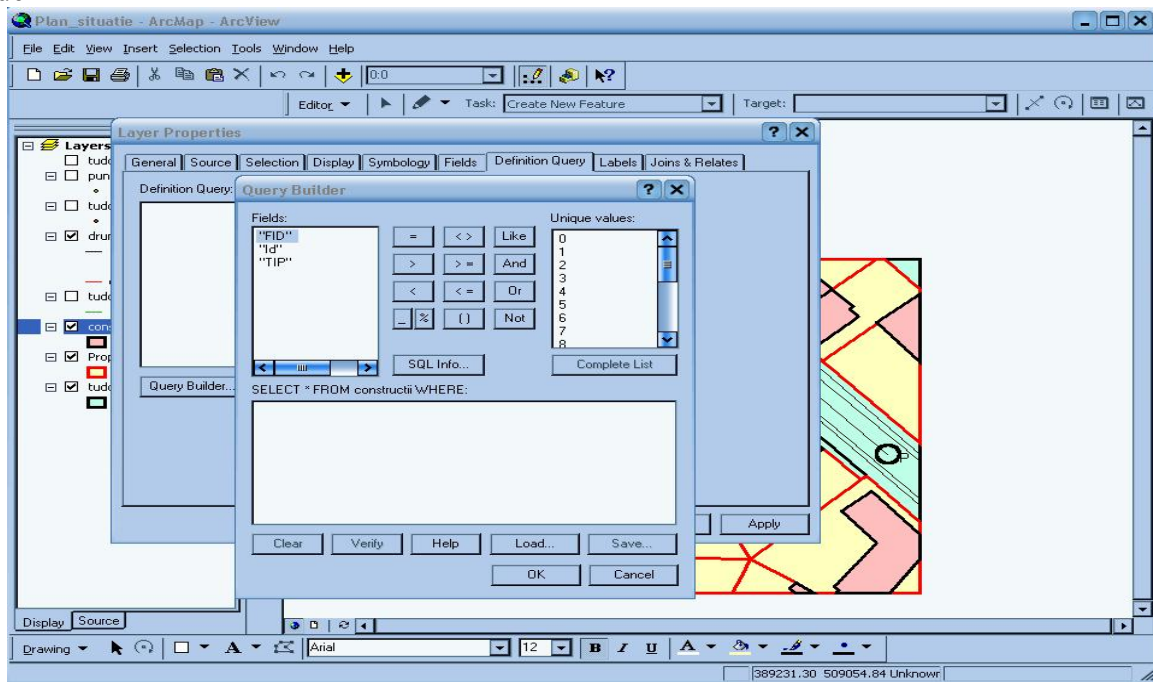


Figure.11

8. The Export of the plan as image format

When the project is finished, the map can be exported: File → Export Map → Export

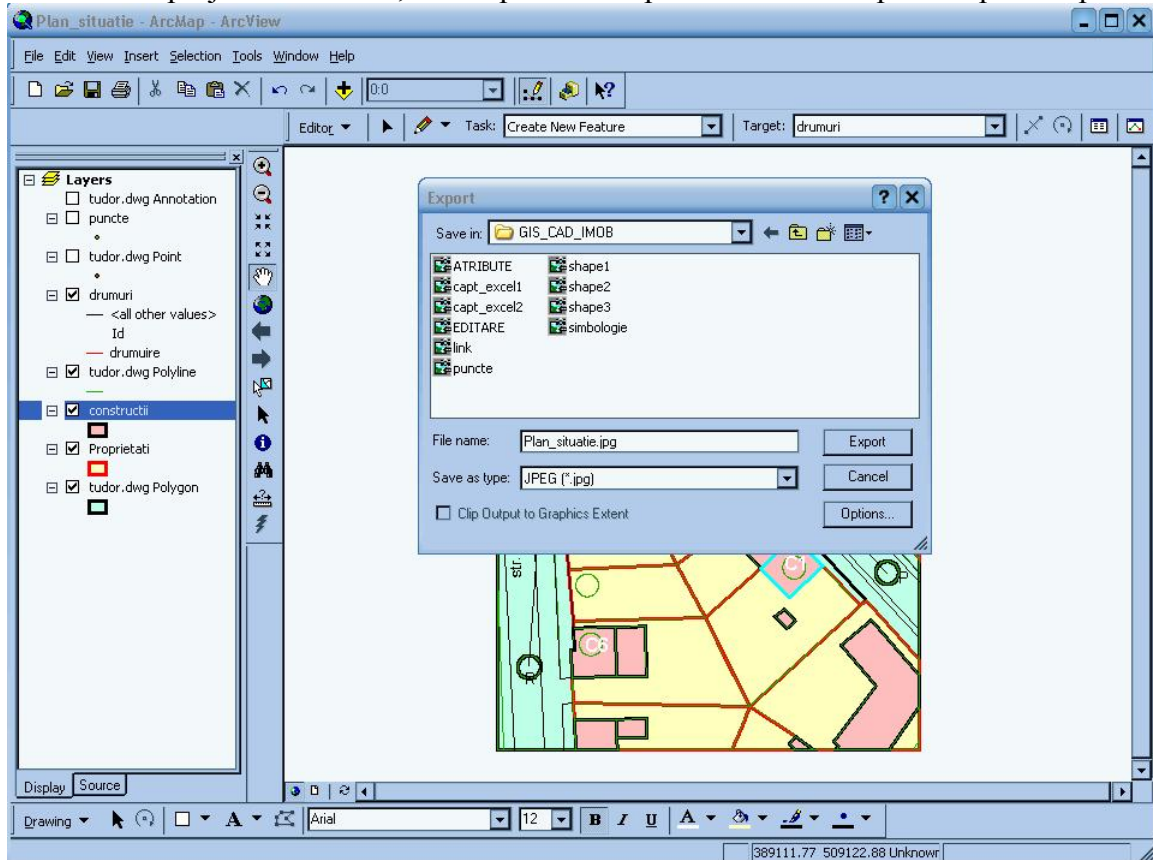


Figure.12

Conclusions

The work wants to have a technology that in time will allow the identification of the topographical, geodesic and cadastral data processing using as a primary data base within the archaeological cadastral GIS area of the archaeological sites and/or the national monuments or UNESCO.

Bibliography

Pădure I., Ungur, A.R. - Cadastre de specialitate, Seria « Didactica », Editura «Aeternitas»,
Universitatea « 1 Decembrie 1918 », Alba Iulia