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Challenging Issues to Prepare an Urban Archaeological Database, Tarsus Historic City Centre

Bir Kentsel Arkeolojik Veritabanı Hazırlamanın Zorlukları, Tarsus Tarihi Kent Merkezi

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Abstract

Archaeological potential could not be assessed with spatial references in Tarsus historic city centre like similarly many multi-layered historic city centre in Turkey. Conservation Councils or Museums usually have traditional and inadequate conditions in their archives. Although the number of archaeological researches using the developing technological facilities and Geographical Information Systems is increasing gradually, it is not yet at a sufficient level. Therefore, at the first stage, an Urban Archaeological Database (UAD) was established for spatial assessments. GIS based UAD let experts to evaluate archaeological potentials in Tarsus historic city centre for developing specific strategies in similar planning issues. In other words, UAD was developed as a planning tool to evaluate archaeological resources in spatial context. The paper mainly focuses on UAD and especially spatial evaluation of different archaeological findings instead of whole processes of research project.

Keywords: Tarsus, Urban Archaeological Database (UAD), GIS, City Planning

Öz

Türkiye'de Tarsus tarihi kent merkezi gibi çok katmanlı kentlerin arkeolojik potansiyeli mekânsal olarak değerlendirilememektedir. Müze veya Bölge Koruma Kurulu Arşivlerinde arkeolojik bilgi genellikle geleneksel yöntemler ile derlenmektedir. Gelişen teknolojik olanakları ve Coğrafi Bilgi Sistemlerini (CBS) kullanan arkeolojik araştırma sayısı giderek artsa da henüz yeterli bir seviyede değildir. Bu nedenle, araştırma ekibi tarafından mekânsal değerlendirmeler yapılabilmesi için öncelikle Kentsel Arkeolojik Veritabanı oluşturulmuştur. CBS olanaklarını kullanan veritabanı sayesinde Tarsus tarihi kent merkezinin arkeolojik potansiyelini mekânsal olarak değerlendirme mümkün olabilmiş ve benzer planlama sorunları için stratejiler geliştirilebilmiştir. Daha açık bir ifadeyle, Kentsel Arkeolojik Veritabanı arkeolojik değerlerin mekânsal bağlamını değerlendirebilmek için bir planlama aracı olarak geliştirilmiştir. Araştırma ekibi artan yaygın kullanım alanını dikkate alarak özgür ve açık kaynak kodlu CBS yazılımı olan QuantumGIS (QGIS) kullanmıştır. Makale, araştırma projesinin tüm süreci yerine, temel olarak Kentsel Arkeolojik Veritabanı ve farklı arkeolojik bulguların mekansallaştırılmasına odaklanmıştır.

Anahtar Kelimeler: Tarsus, Kentsel Arkeolojik Veritabanı, CBS, Şehir Planlama

Introduction

In Turkey, when we make an assessment in terms of the spatialization of archaeological data at urban scale, the number of GIS-aided inventory serving archaeology and planning work is very limited. The Marmaray Project in Historical Peninsula of Istanbul and Antakya Museum Hotel project are current discussions for the protection of urban archaeological heritage during large scale investments. However, in any way, investment processes, which are designed to allow in-situ conservation of archaeological findings by special designs, could come to the agenda with delays in the completion of projects and archaeological findings are mostly presented as a problem area. In other words, urban archaeological values can only come to the fore when large-scale investments are in question. The issues in urban archaeological heritage management and its integration into daily life is a larger problem area. In this context, as emphasized in international documents, it is important to handle archaeological values in the planning processes at different scales at the earliest possible stage. In fact, the management and conservation of known and/or visible archaeological findings, monumental artefacts or excavation areas in urban life is actually limited to site management issues. However, there is a fundamental deficiency in spatializing sub-soil archaeological layers in a way that can provide input to the planning process and determining the principles of urban archaeological protection. The research project, which forms the basis of the article, basically offers solutions for this whole process[1].

The article focuses on issues in urban archaeological data management systems, as the starting point for an overall process from site studies to desk-based assessments. In Turkey, local museums and regional conservation councils store archaeological data with traditional method. There are limited number of archaeological research using digital technologies and GIS database. Sometimes, local authorities prepared digital archives, but datasets are usually inappropriate for spatial inquires. Therefore, city planners, archaeologists, conservation experts and decision makers like the experts of Regional Conservation Councils or Local Authorities could not exactly assess archaeological potential. In this article, aforementioned issues are going to be examined in Tarsus Historic City Centre as case study area.

Method

Tarsus is a district in southern Anatolia, Turkey with approximately 300.000 populations according to recent census. Tarsus has been settled since Late-Neolithic ages in Cilicia[2], approximately 30km far from recent coastline. When going south from Anatolia, it is necessary to cross the Taurus Mountains in order to reach the Mediterranean and Tarsus is the first large settlement encountered on the plain. In addition, Tarsus, which is connected to the Mediterranean through the Berdan (Kydnos) river, is located at a crossroads between the Mediterranean and Central Anatolia, and between Çukurova and Northern Syria, where human and goods traffic intersect[3].There are known monumental structures like Roman Road-Colonnaded Road, Donuktaş (Roman Temple from Hadrian' times), Baths or the Cleopatra Gate. In addition to monumental remains from especially in Roman period, archaeological findings and researches present multi-layered structure of Tarsus. Moreover, historic pattern of city centre has an authentic character in setting. When research team evaluate archaeological researches and findings in Tarsus, an ongoing settlement since the Late-Neolithic Ages was observed. Historical sources mention about Neolithic settlement but earliest archaeological findings indicate an Assyrian Settlement[4]. Archaeological researches and historical data indicate a settlement pattern starts from Gözlükule (a prehistoric mound at the south of centre) and enlarging to northern area and the eastern bound of Cydnus River by the time[5].

Today's, Tarsus is in a developing region with the pressure of urban development in its multi-layered historic centre that has different character zones with varying archaeological potential and development

[1] Belge and Aydınoğlu, 2017: 462
[2] Özyar and Ünlü, 2015: 41.
[3] Özyar and Ünlü, 2015: 41.
[4] Goldman, 1935 and Goldman, 1937
[5] Zoroğlu, 1995a

patterns. In other words, in addition to continuously inhabited areas there are varying settlement patterns and discontinuities in spatial context.

Research project mainly aims to develop a method to handle urban archaeological – especially sub-soil archaeological- resources into planning process of multi-layered historic city centres by discussing Tarsus case in detail. Therefore, first of all, research team established an UAD (Urban Archaeological Database) for spatial assessments. UAD is developed by primary and secondary datasets. Research method bases on handling urban archaeological heritage within planning process by GIS tools and UAD is a pioneer project for Turkey.

In fact, comprehensive archaeological researches are needed to determine the plan schemes of cities in different periods. However, it is unlikely that the planners will wait for the results of archaeological researches specific to each city and provide new researches. For this reason, the research method is to do a comprehensive literature review in addition to the archives in different institutions and organizations. Data sets that exist in different institutions but cannot be evaluated together should be compiled and read together. On the other hand, it should not be forgotten that plan decisions should have a flexible structure in case new archaeological data emerge[6].

Urban Archaeological Database (UAD)

In Turkey, archaeological heritage in multi-layered historic city centres, not only sub-soil resources, even monumental sites, could not be perceived by the most of citizens. Archaeological traces of multi-layered cities cannot be followed in daily life. In defined context, an inter-disciplinary research project, was completed in March 2016 supported by TÜBİTAK-1001. In addition to city planners, research team includes archaeologists, GIS experts and cultural heritage management professionals. The paper aims to basically focus on UAD and briefly mention about outputs of project.

Archaeological datasets could be evaluated into two groups according to their reliability as primary and secondary datasets. Primary datasets are first-hand scientific information and archaeological documents. On the other hand, secondary datasets are the writings of ancient writes and travellers. In addition, the experiences and investigations of experts in the Museum or local people were partially evaluated as secondary datasets.

In any case, in Turkey, the fundamental issue in characterized investigate prepare inside previously mentioned strategy is changing archive systems or archaeological datasets in numerous institutions and specialist. In expansion, the secondary datasets ought to be evaluated beside primary ones. Hence, the structure of UAD must be adaptable for shifting information from distinctive sources and as of late gotten information amid investigate extend by field examinations or verbal history (Figure-1).

Data Sources – Collecting Data:

Archive documents and literature about archaeological and historical researches in Tarsus historic city centre have been investigated. Documents about archaeological findings were evaluated according to data obtained from the local archives of the Municipality of Tarsus, Research Centre for Cilician Archaeology of Mersin University (KAAM as Turkish acronym), Regional Conservation Council in Adana and Tarsus Archaeology Museum. In addition to local ones, national archives of the General Command of Mapping, the State Archives of the Republic of Turkey and the National Library and international archive of the Museum of Architecture of the Berlin Technique University were searched for written and visual documents.

In the local archives of the Municipality of Tarsus, because of institutional incapability, the most of maps are almost lost. Only partial raster copies of plans could be obtained from the archive. Then,

[6] Belge and Aydınoğlu, 2017: 463

Research Centre for Cilician Archaeology in Mersin University (KAAM) was investigated for the reports and publications of archaeological researches.

As main data source of database, the archives of Regional Conservation Council in Adana and Tarsus Archaeology Museum were cross-inquired and investigated in detail. In Turkey, in third degree archaeological sites, development may be allowed after archaeological inquires of museums and decisions of Regional Conservation Councils[7].

Furthermore, national archives were investigated for visual and historical data. First of all, old aerial photographs of Tarsus were obtained from National Archives of the General Command of Mapping. Aerial photographs were geo-referenced to evaluate archaeological-cadastral traces and change in macroform of the settlement. Furthermore, mass destruction by increasing development pressure after 1980s could be analysed by comparison of aerial views with recent satellite images. Moreover, the State Archives were investigated for cartographic document indicating archaeological traces. A few of them indicate the boundaries of Tarsus and urban form in 1940s. In addition to national archives, digital copies of Hermann Jansen Plan (1935) was obtained from the archive of the Museum of Architecture of the Berlin Technique University[8]. Jansen's studies include valuable data on green areas, vacant lands and 1930s current pattern are used to evaluate multi-layered core of Tarsus, before modern development and population increases.

Analyzing Data and Database

After collecting data from different sources and varying authorities, research team transferred different datasets into QuantumGIS (QGIS) based database with geo-referenced polygonal layers. Attribute table for primary data seven general headings;

- Code Numbers for archaeological data as A1-A2-...-A(n) and codes for details like A1-1 / 2 / ... / (n), those numbers are actually ID numbers for each archaeological finding with their context.
- Informative definitions including general context and known findings in site.
- Locational / Cadastral data with addresses and definitions.
- Archaeological researches, definitions, types, date-period and spatial details.
- The details and specifications for archaeological findings.
- Archaeological stratification, depths and specific periods. In detail, according to historical development of Tarsus periodical columns were defined to understand and assess archaeological layers and probable depths.
- Information about raw data for further studies.

Finally, an attribute table for primary data was prepared including seven sub-groups of attributes and a matrix of varying data with 30 columns and 411 rows was obtained. After that, attribute table was interlinked with spatial data by GIS tools.

Actually, archaeological excavations in the first degree Archaeological Sites in Tarsus historic city centre like Gözlükule, Roman Road and Donuktaş are declared as scheduled conservation areas. There are ongoing archaeological researches in Gözlükule Tell[9] [10] and Donuktaş Temple[11]. Each research team has their own documentation system and database for their excavations including movable and immovable findings. Also, there are published results for excavations at Cumhuriyet Square[12], Makam Mosque and Roman Bath[13] [14] [15]. Those excavation sites were evaluated as specific project zones that

[7] Belge, 2016: 446
[8] http://architekturmuseum.ub.tu-berlin.de
[9] http://www.tarsus.boun.edu.tr/
[10] Özyar and Ünlü, 2015: 41.
[11] Held, Kaplan and Burwitz, 2015.
[12] Zoroğlu, 1996
[13] Adıbelli, H., 2013
[14] Adıbelli, I.A., 2007
[15] Adıbelli, I.A., 2012

need special planning tools and approaches including urban design and architectural issues by archaeological supports. Therefore, excavations sites were listed as a single row in UAD. In fact, 411 rows in UAD are linked with specific 75 archaeological research area (Figure 2). However, a complex database that have to include archaeological features and finding was not developed for research project. Because, research project mainly focused on handling archaeological resources in planning process by developing a basic analyse.

In Turkey, each multi-layered city has been planned by varying teams, which would be planning staffs in governmental or local authorities or the members of private planning companies that hired by authorities. According to legal and administrative frameworks, each planning team have to analyse sites with different professions. But, recent research tools or methods only bases legal boundaries of archaeological sites. Therefore, very limited and restricted planning decisions could be developed. Therefore, research project and UAD were developed and concentrated on enhancing planning analyses to enrich planning decisions in multi-layered cities without any extra archaeological research and campaign. In other words, research project bases on existing archaeological data that stored in different institutions.

As mentioned above, the most important dataset in the UAD are researches and rescue work by museum experts, including depths and general findings. However, there is no standardized inventory form for every archaeological finding. Therefore, there is a lack of harmony between them. Only 15 of 75 sites include specific data indicating depths of each archaeological layer. Therefore, research team has really very-limited information to evaluate three-dimensional stratification. However, by diachronic maps, possible archaeological layers would be evaluated. Then known data used in detail to evaluate near environment. Those detailed points have used to discuss character zones in detail. Also, the depths of agricultural ground soil were overlaid with other layers to define character zones

Sometimes, coordinates of archaeological data could not be found. Therefore, different documents and hand-drawings of archaeological studies and findings were geo-referenced to assess archaeological data in same context (Figure-3). In additions to excavations, data obtained from non-destructive methods were handled to UAD (Figure-4). Also lost structures like the Theatre[16], were defined as a different layer in UAD (Figure-5).

In addition to primary dataset, an attribute table for secondary data was designed for general information and simple spatial data. Only basic information and the latest status of the site have been added to the table. That secondary table includes findings, which has no information about depths and only including verbal data about movable objects. Investigations during infrastructure work and probable locations of well-known artefacts like the Sculpture of Marsyas were added into UAD. Furthermore, probable locations and boundaries of Hippodrome and Gymnasium were approximately determined according to the statements of ancient writers like Strabo.

Conclusion

UAD allows planners and archaeologists to assess geographical features, archaeological data and recent urban landscape together to understand historical development of Tarsus and to determine urban archaeological character zones (Figure 6). Recently, the project should be seen as a preliminary study for local authorities and different experts to enrich researches for multi-layered cities.

Consequently, wholly conserved, partially or wholly destroyed archaeological heritage could be determined as urban archaeological character zones. Then, character zones were categorized for planning and conservation strategies according to archaeological potential, recent settlement pattern and the depth of archaeological findings as; Special Research and Project Areas, Conservation Zones, 1st Degree Urban Archaeological Potential, 2nd Degree Urban Archaeological Potential, 3rd Degree Urban Archaeological Potential, Reserve Areas or Development (controlled) Areas. Furthermore, local

[16] Goldman, 1935: 528

authorities, not only Tarsus Archaeology Museum but also the Municipality became more aware about archaeological potential to evaluate their development and conservation strategies.

In addition to issues in Urban Planning, design and management of UAD is another challenging issue. Trend Surface Analysis, which is especially emphasized by Wheatley-Gillings[17], is an important analysis method for understanding how deep a particular archaeological layer is in the present surface and the stratigraphy (archaeological stratification) of the area. With appropriate data, it is possible to obtain an idea about the possible depths of archaeological layers that are not visible especially under the ground. However, in order to make a valid estimation in the field of archaeology, it is not sufficient for data to be only spatial. In other words, just two-dimensional (X, Y) locations information for archaeological date is insufficient for estimations. Archaeological data should also include stratigraphic depth (Z) information. In order to perform "Trend Surface Analysis", the data in the urban archaeological database should be collected in a way to make such analyses. By Wheatley-Gillings[18] (2002), object-oriented GIS (Object-oriented GIS) and multi-dimensional GIS (Multi-dimensional GIS) are discussed as possible uses of Geographic Information Systems. In fact, a wide variety of uses are evolving in the field of archaeology, from simple visualizations to cross-strata and spatial inquiries. In order to make spatial analyses for multi-layered relationships, archaeological data should be collected systematically in the field and transferred to the database, considering that these analyses can be made.

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[17] Wheatley and Gillings, 2002
[18] Wheatley and Gillings, 2002

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Figures

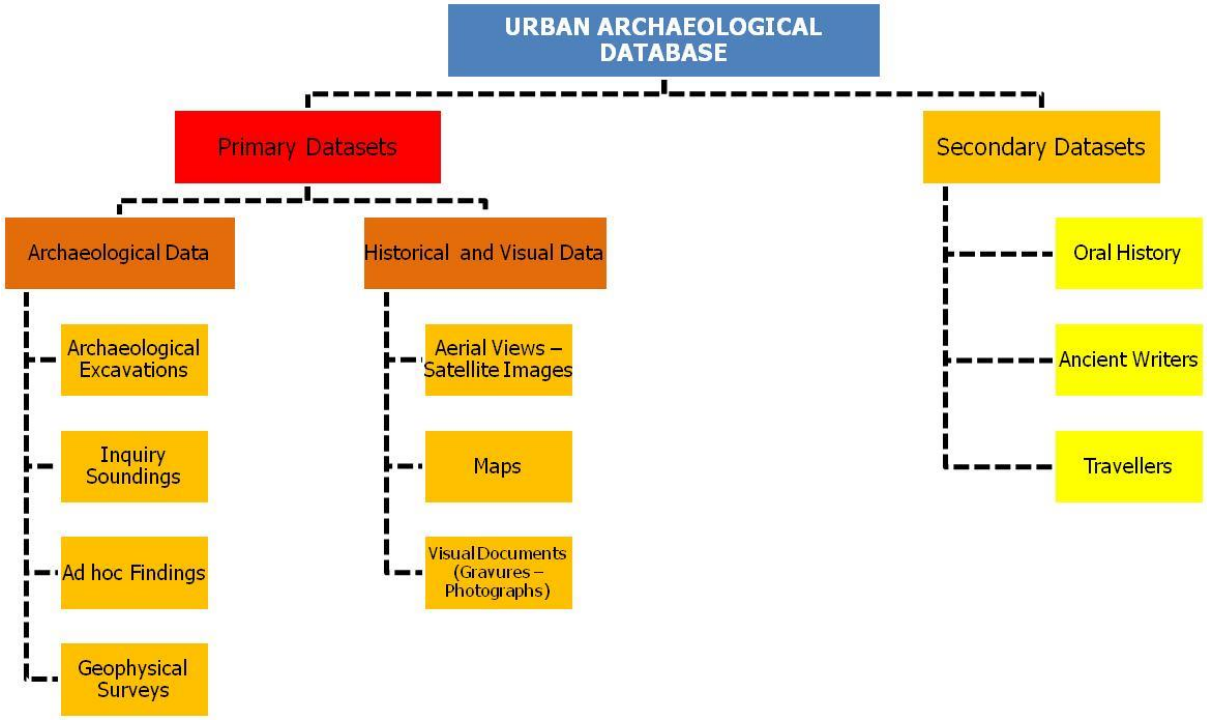

Figure 1. Primary and secondary archaeological data

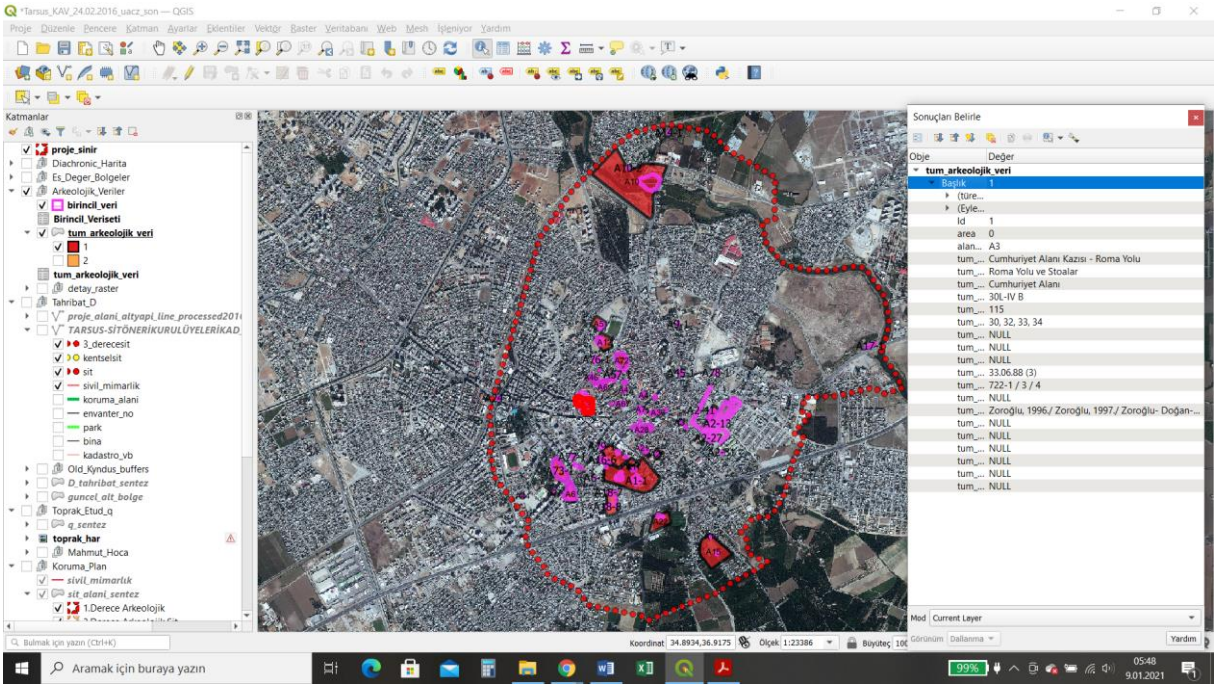

Figure 2. A screenshot from UAD indicating all primary data and archaeological findings

Figure 3. Screen view of geo-referenced drawings of an inquiry sounding in historic core. An inquiry sounding was completed by museum experts for ad hoc findings during an infrastructure hole. There are only two hand-drawing maps without any coordinate indicating the location and boundaries of a trench that was excavated for an infrastructure work. Therefore, hand-drawings were geo-referenced to understand overall location (left-hand side) and exact boundaries (right-hand side)

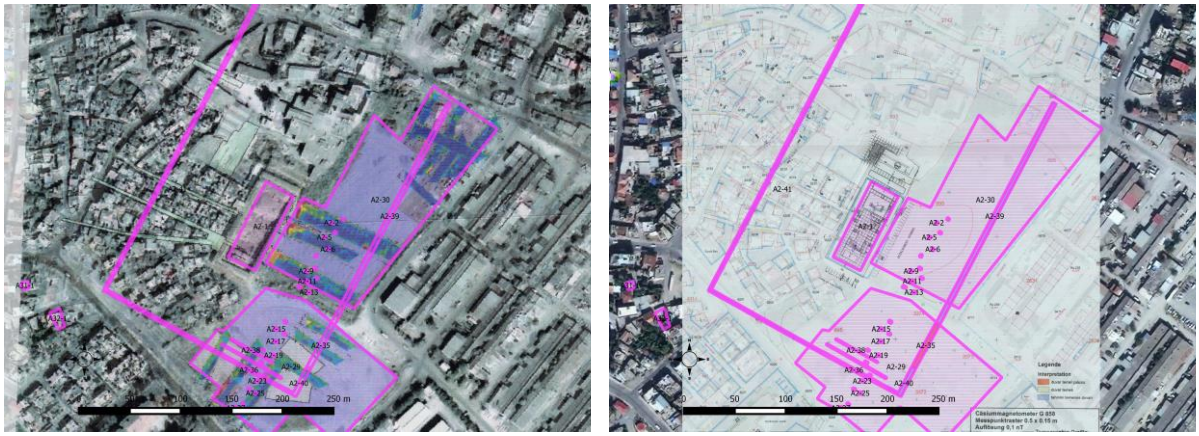

Figure 4. Geophysical survey around Donuktaş (a Roman Temple dated Hadrian Period) was operated by excavation team (Held, 2012). The results of geophysical survey were transferred to database. Boundaries of survey transferred from satellite imaged drawing (left-hand side) and controlled by drawings of existing structures. In addition to monumental basement of the Temple, boundaries of Temenos Wall would be determined (right-hand side).

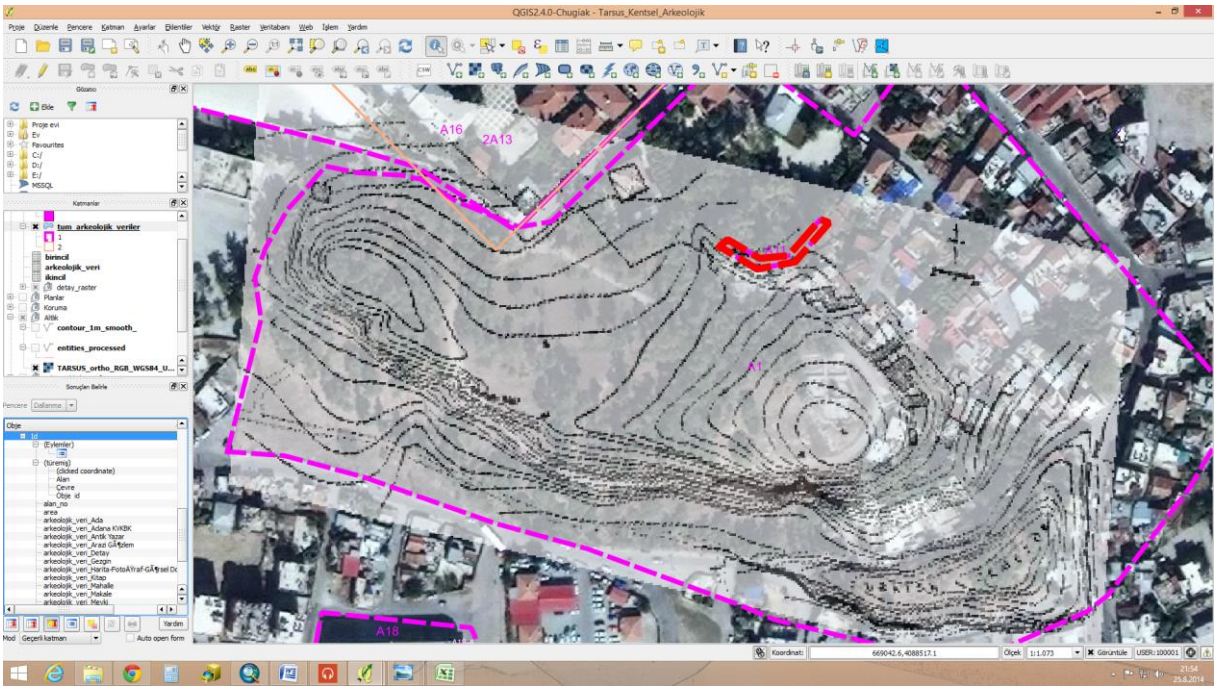

Figure 5. The Theatre that was indicated by Goldman (1935: 528) geo-referenced according to other structures.

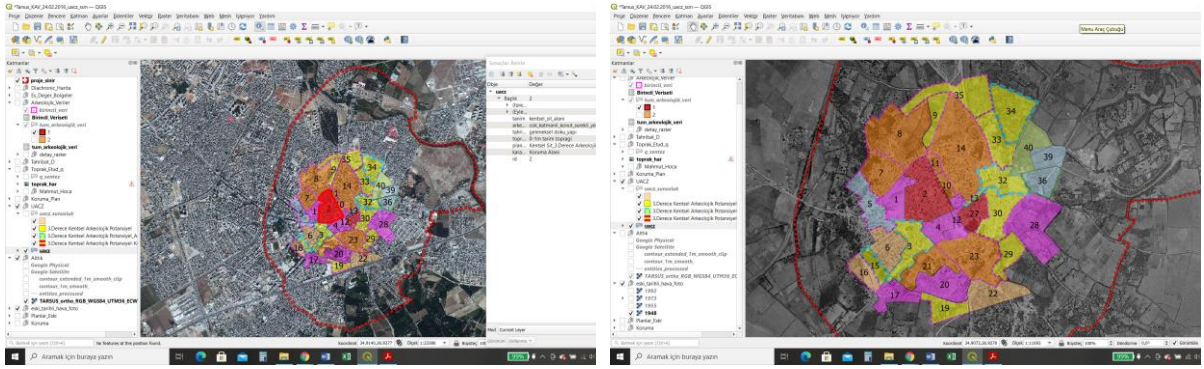

Figure 6. Screenshots from UAD indicating urban archaeological character zones on satellite image and old aerial photograph (1948).