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## The Research on Anthropogenic Evolution of the Landscape in the Locations of Antique Settlements of the Bosporan Kingdom: on the Example of the Hillfort “Belinskoye”.

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### ABSTRACT

The article explores the questions of historical and cultural landscape development throughout the territory of the antique settlement “Belinskoye”. The ancient settlement was located in the East of Crimea and was a part of the Bosporan Kingdom. The data of the archaeological research from different parts of the settlement and the magnetic survey of the settlement's territory were used for analysing. Landscape dynamics due to anthropogenic activities during the period from the late Bronze Age until the early Middle Ages is examined. The probable period of the maximum of anthropogenic changes is defined.

**Keywords:** Crimea, Kerch Peninsula, tract Adzhiel, Bosporan Kingdom, settlement “Belinskoye”, archeology, antiquity, magnetic survey, cultural historical landscape.

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## INTRODUCTION

The development of cultural landscape research as an independent branch of science started since the early XX century in the academic works of both Russian and foreign researchers (Berg, 1915; Sauer, 1925). Further development of the idea of cultural landscapes, their classification were taken forward in the works of the mid XX century (Hartshorne, 1939; Saushkin, 1946; Milkov, 1973). A lot of scientific papers published over the past decades were also devoted to the questions of anthropogenic landscapes development. The concept of cultural landscapes and its classification are also provided in the guidelines of UNESCO (UNESCO, 2012, Annex 3).

The problems of anthropogenic landscape evolution in the context of historical and archaeological study areas are also in the forefront of modern Russian historiography (Nizovtsev, 2010, p. 5). In this regard, the territories of the modern Kerch and Taman peninsulas are no exception, as they have formed the core of Bosphoran Kingdom in the ancient period. Thanks to the large-scale archaeological research in recent decades XX – early XXI century, it is possible to obtain fairly detailed maps of archaeological sites of different periods, located in the territory. Systemic archaeological excavations were undertaken on some of those objects. In some cases, attempts to restore the individual stages of their formation were made (Maslennikov, 2003, 2010; Zavoykin, 2011, p.18-39). Overall, however, until now, although it was understood that the modern landscape of the Kerch and Taman peninsulas are mainly the result of anthropogenic activities, there was no any detailed reconstruction, even individual objects, not to mention the natural and economic system as a whole.

From the viewpoint of V.A. Nizovtsev, which we fully share, the main objectives of anthropogenic landscape genesis are: “1) the identification of anthropogenic changes in a landscape, which result in a change of the landscape itself, 2) the establishment of a zero-point of anthropogenic changes, i.e. primary changes, which occur as a result of human activities, and the evaluation, on this basis, the age of anthropogenically-derivative landscape complexes, 3) the determination of the importance of landscape in the development of different material cultures, ethnicities, anthropogeocoenoses, anthropo (demo) ecological systems or ethnosocial natural-economy systems; 4) the establishment of certain species and systems of environmental management in specific landscapes, i.e. the effects of nature-using, which induced the anthropogenic dynamics of landscapes and anthropogenic formation of cultural and cultural-historical landscapes” (Nizovtsev, 2010, p. 6).

## METHODS OF RESEARCH

### The object of study

The reconstruction the overall picture of the natural landscape evolution due to anthropogenic activities in the vast area (for example, the across of the Kerch Peninsula) is possible only through a thorough study of individual, relatively closed local objects. The bases of such objects are the settlements of different types and chronological periods. In the northern part of the tract Adzhel (Crimean, area close to Azov Sea), at least for the Roman and late antiquity periods, such a basis is the antique settlement “Belinskoye”.

The Hillfort “Belinskoye” is located on a hill, starting from the western slope of the Adzhelskaya gully stretching in a westerly direction towards the Uzunlar ridge of soil. The name of the monument is connected with the modern name of the nearest village, located one and a half kilometers north-west from the hillfort.

For the first time the detection of the settlement was mentioned in the manuscript chronicles of protective excavations of the Kerch Historical and Archaeological Museum in the report of S.S. Bessonova in early 50-ies. XX century. In different times (70-80-th of XX century) the settlement was surveyed by I.T. Kruglikova, O.D. Chevelev, A.A. Maslennikov, for example (Maslennikov, 1998; Maslennikov & Chevelev, 1981). Probably, there was the antique town Tafr in its place, mentioned by Claudius Ptolemy (III, 6, 5) (Nobbe, 1843).

Natural landscape formation in this part of the tract Adzhel took place in a typical Crimean, close to the Azov Sea area, mode (Klyukin & Korzhenevsky, 2004, p. 14-15). The most elevated areas to the north and north-west of the fort, were formed on the Ectoprocta reefs. They are mainly represented by hard Ectoprocta

limestone. In the area of the settlement itself, the gully cuts the softer shell rock, limestone and clay, formed by the accumulation of sediments between reefs. To the south and south-east of the fort extends the relatively flat valley until the next limestone ridge (Figure 1).



**Figure 1. View of the tract Adzhiel.**

About 700 m to the south-south west and 400 m north of the settlement “Belinskoye”, according to the archaeological investigations in the 60-s of the last century, two ancient settlements Derzhavino II, no. 434 (Veselov, 2005), no. 181 (Kruglikova, 1975) and Derzhavino III, no. 435 (Veselov, 2005), no. 182 (Kruglikova, 1975) are located. Researchers attribute these settlements to I-III centuries BC. The Hillfort “Belinskoye” and other known settlements are located 1-2 km north of the area of the most fertile land for the Kerch Peninsula (Ukrzempromekt, 1967; Dragan & Blindman, 1996). This had also probably influenced to choose the location for these settlements.

The hill where the settlement of “Belinskoye” is situated now, is fully sodded and has a total area of 12.4 hectares. The greatest height difference is observed in the north-eastern part, where the northern corner of the plateau descends to the Adzhielskaya gully significantly lower, than the eastern corner. The central part of the plateau is more elevated, than the north-western and south-eastern edges, and the south-western edge is limited with ditch, which is artificial in origin. The excavations in various parts of the settlement revealed that such a landscape partly reflects the natural terrain configuration, which had been here prior to the anthropogenic changes.

### **Archaeological research**

The systematic investigations of the city “Belinskoye” have been conducted since 1996. Initially, they were mainly concentrated in the northern part of the hill, but further expanded along the perimeter of the settlement in the western, southern, central and eastern areas. Excavations were carried out on the large areas in the layers with fixing synchronous construction residues of each construction period over the entire area of the excavation up to the level of the ancient Earth's surface, on which the cultural layer is based. This technique yielded in a relatively short period of time, sufficient material for the reconstruction of changes of anthropogenic landscape not only at the test site, but also on the entire area, occupied by the hillfort.

### **Magnetic prospecting**

Simultaneously with the excavations, since 2007, the magnetic survey has been carried out on the spot, which showed that all modern landscape of the hill, on which the settlement is located, is anthropogenically-derived. Magnetic prospecting on the site “Belinskoye”, held during Belinskaya archaeological expedition from 2007 to 2012. For 6 years of research, the exploration have been conducted on a total area about 7.5 hectares, which is about 85% of the settlement. The remaining 15% - there are small areas with steep slopes, adjacent to the perimeter of the fort, where measurements difficult and useless, or sites excavated before 2007.

The works have been carried out with the use of two quantum magnetometers PKM-1 (firm “Geologorazvedka”, St. Petersburg, Russia), one of which operated as a magnetic variation station. The measurements have been carried out along profiles 40 m long with step by 0.5 m along the profile. The distance between the adjacent profiles 0.75 m. At the constructions of magnetic maps as the zero level of the field, was accepted the field's median value for each of the plots, measured during the working day, taking into account day-temporal variations of the magnetic field.

## RESULTS

### The results of the magnetic survey

The resulting map of the magnetic field anomalies, superimposed on the satellite image of Google Earth, is shown in figure 2. The black parts of the map correspond to negative anomalies -20 nT and lower, white +20 nT positive anomalies and higher. Shades of gray correspond to changes in the magnitude of magnetic anomalies in the range of -20 to +20 nT. Before moving on to the interpretation of the map, it is necessary to make a few general remarks.



Figure 2. Map of anomalies of magnetic field on the hillfort “Belinskoye” obtained from a magnetic survey 2007-2012.

Hillfort “Belinskoye” is a multi-layer monument. Remains of destroyed structures overlapped, and make it difficult to select the building structures (this applies, mainly, to the negative anomaly caused by the

non-magnetic construction materials - limestone). Besides, the settlement area, was one of the areas of operations during Second World War. Many anomalies can be interpreted as the remains of ancient and man-made objects and economic activities, so as the traces of the Second World War. Naturally in this publication, we choose the first option, knowing, that only with the excavations it is possible to check its validity. This applies, especially, to the positive anomalies of the magnetic field. The linear positive anomalies are treated on the interpretation plan as a streets (the positive character of the anomalies supposedly linked with ash and slag, fragments of pottery, thrown into the street from the premises), however, it could be the buried trenches of the Second World War. Positive anomalies of arbitrary shape, which occupy large areas in many parts of the settlement, may be associated with the ancient pits, hearths, fire sites, and with traces of hostilities, and their detailed interpretation was not performed. In addition, the surface layer of the settlement contains a large number of “modern” iron objects, which create strong anomaly. During the work on a number of plots, there were conducted a preliminary “cleaning” the surface, but to do such work on the whole area was impossible, because the complexity of this “cleaning” is comparable to the complexity of magnetic prospecting itself. Although these anomalies are pronounced, in most cases they occupy a small area and do not materially affect the interpretation of “archaeological” anomalies, but in the northern part of the town, where previously were houses XIX-XX centuries, abnormalities of iron objects form a continuous area and completely mask the “archaeological”.

The overall interpretation plan for the results of the magnetic survey 2007-2012 shown in figure 3. In the same figure, displayed the division of the settlement into separate zones, which can be carried out on the results of the magnetic survey. However, the purpose of this publication is not so much the elucidation of the general layout and character of building of the settlement itself in the roman and late antic time (see. About this: Zubarev & Sedich, 2013, pp. 250-274), but the process of formation of the modern cultural and historical landscape of the settlement “Belinskoye”.

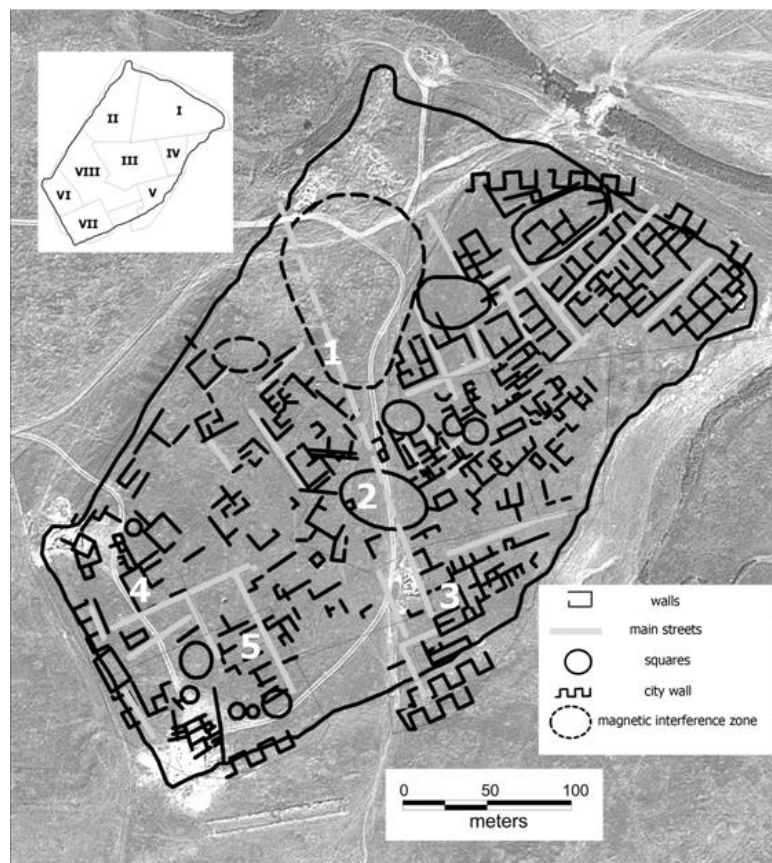


Figure 3. Interpretation plan of the results of the magnetic survey on the hillfort “Belinskoye” in 2007-2012.

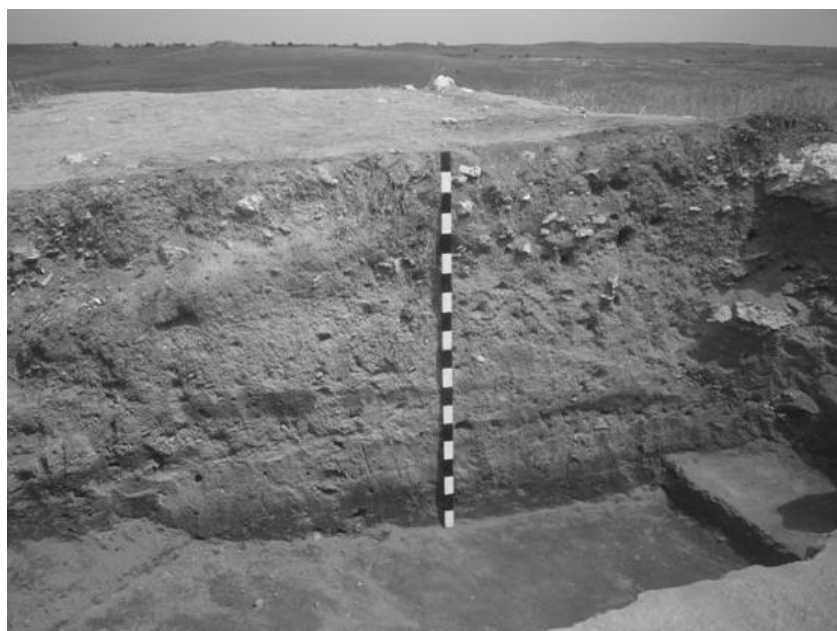
The landscape of the territory before the emergence of the settlement. Results of excavation

The basis for the reconstruction of the original natural landscape of the territory, which currently holds the fort “Belinskoye”, is an ancient ground surface, lying under the anthropogenic cultural layer. In northern part of the hill (excavation “North”) it is continental loam with power up to 0,25 m, under it there is a layer of yellow clay, below which there is a layer of more elastic gray-green clay (figure 4). The abundance of clay, including a fairly high quality, promoted the development of local ceramic products (at least modeled ceramics). Part of the economic pits, investigated in a great numbers in this area (including outside of a defensive perimeter fortification), no doubt could be interpreted as signs of clay mining. This is especially true for the pits without clearly expressed configuration. All of them were later used for trash.



**Figure 4. The continental clay in the section of an economic hole in the northern part of settlement.**

A similar structure of the rocks underlying the cultural layer, apparently, is typical for the entire north-western slope of the hill. In any case, and in the western part (excavation “Western”), we see the same picture (figure 5). This fact was taken into account by the builders during creation of northwest defensive wall. Soft rocks here were reinforced on the outside perimeter not only with a layer of white limestone crumb, but also a dense layer of rubble stone, dug into the mainland along the entire length of the foundation.



**Figure 5. The cultural layer and underlying continental loam in the western part of the settlement.**

The zone soft continental rocks along the north-western slope elongated unequally to southeast deep into the hill. The largest area it occupies in the northern part on the north-eastern slope. In the south-west, it gradually becomes narrows and already on the excavation “Western”, part of the foundation of the corner tower is located on the yellow continental shell rock. The layer of shell rock rises gradually in a southeasterly direction along the south-western slope of the hill. In 1996, approximately in the middle between the western and southern corners of the hill, was investigated economic pit with a small plot adjacent to it. The thickness of the cultural layer is not more than one meter, against 2 m in the western plot (figure 5) and 2.3 m in the south (figure 6). The underlying rock here is a shell rock, outcoming in the ancient times, to the surface.



**Figure 6. The cultural layer and continental rock in the southern part of the settlement.**



**Figure 7. The continental rock in a section of an economic hole in the central part of the settlement.**



**Figure 8. The continental rock in east part of the settlement.**



**Figure 9. The continental rock in a section of an economic hole in east part of the settlement.**

Having reached a maximum, the layer of a shell rock goes down in the southeast direction. On the southern plot (excavation “Southern”) the rocks underlying the cultural layer are presented mainly by limestone shell rock (figure 6), however, here it isn't a continuous monolith. It is cut by the deep cracks and sites filled with continental loam and clay. Perhaps, the part of large stone blocks got here as a result of destruction of higher sites of rocks, as it takes place on the nearby hills along the Adzhielskaya gully, which were not affected by anthropogenic influence.

In the central part, the ancient ground surface, the underlying cultural layer, represents the same limestone shell rock, overlapped in places by continental loam. It is traced, for example, in a section of the



economic pit, investigated on the excavation “Central” (figure 7). Such a structure is typical for the remaining parts of the hill up to the north-east edge. This is well visible as on steep slopes in this part of the hill, so as on the sections of funnels of times of the Second World War. The highest level of the shell rock, which comes out in the ancient time to the surface, is fixed in the eastern part of the settlement (excavation “East”). Here it represents relatively flat monolith, which is steeply breaking towards the Adzhielskaya gully (figure 8-9).

So, the initial landscape, a so-called “zero” point, represented the rough hill which basis constituted by a yellow shell rock with separate impregnations of stronger rocks of Ectoprocta limestone. Low sites, crevices and hollows were filled with clay and loam, on higher sites the coarse rocks appeared on a surface. The hill wasn't the dominating height on the terrain, however availability of water in close proximity and the extensive valley, suitable for agriculture and cattle breeding to the southeast and north from it, did this territory very attractive to the person.

#### **Change of a landscape during the period from late bronze before the Middle Ages by results of excavation and magnetic survey**

The earliest, archaeological recorded, appearance here of the person belongs to the period of late bronze. The cultural layer of this time and the related construction remains are fixed in the south of the hill (figure 10). Unfortunately, the most part of a layer of this time was destroyed in the course of the leveling works at construction of defensive works of the antique ancient settlement, however it is possible to assume that the settlement of a bronze age, occupied the southern and southeast slopes of the hill, and its inhabitants laid the foundation to anthropogenic changes in a landscape. To number of such changes, besides the cultural layer with the artifacts and construction residues, relate the traces of the undercutting of a continental shell rock and the remained part of the earthen rampart, going parallel to a southeast slope of the hill.



**Figure 10. The remains of construction of the period of late bronze in the southern part of the settlement.**

Much more serious changes of a landscape are connected with time of construction of the antique ancient settlement, which belongs to the II century AD. As it was already noted above, the magnetic survey data testify to existence of traces of activity of the people on all area of the hill. The ancient settlement is divided practically into two equal parts by the “main street” (figure 3, no. 1) passing in the SSE-NNW direction. It should be noted that interpretation of this street is carried out on the basis of linear anomaly, which is negative, but not positive as for other streets. This interpretation is based on results of the excavation which were carried out on the central part of the ancient settlement, where this line anomaly, corresponded street, covered with cockleshells. It, perhaps, determines the negative sign of anomaly. Possibly, the ashes and

garbage were not thrown out on the “main” street. In northern part of the ancient settlement presumable position of this street is shown by a dotted line. The anomalies of a magnetic field are caused here by the numerous modern iron subjects and mask all other objects. In favor of such position of the possible street also testifies the relief. Both in northern and in the southern part it passes in decreases of a relief, the most convenient for exit from the settlement.

The central part of the settlement includes four zones marked with: III, IV, V and VIII (figure 3). The picture received for them by means of magnetic survey is non-uniform. Nature of anomalies in a zone III could be explained by two reasons. On the one hand, buildings of a zone III represents not a complex of constructions, but several buildings of public appointment, having a difficult configuration and adjoining a central square of the settlement (figure 3, no. 2). On the other hand, there can be overlapped remains of various construction periods, which are strongly damaged, including in the period of the Second World War. Except the main square, the sizes about 50x40 m, in a zone III it is also possible to note existence of two more squares, smaller by the size. However, the concept “square” in this case, it is rather conditional and reflects plots free from buildings.

The zone IV adjoining a zone III from the East, has the dense buildings configuration, allowing to carry it to residential quarters of the city. However the buildings here are less ordered than, for example, in a zone I or II, what, perhaps, testifies to a different (lower?) social status of inhabitants. Perhaps, here lived the slaves, serving a complex of buildings in a zone III. The area of a zone makes about 0,3 hectares, and here are about 30-40 buildings of 40-60 sq.m. each.

Very interesting are the possible constructions located in a zone V. Judging by magnetic anomalies, the remains of building in this place, have more accurate structure, than in zones III and IV, and, perhaps, they are the building of public appointment, or palace of the imperious person (figure 3, no. 3). The part of “main” street, about which it was mentioned above, was excavated exactly here.

The zone VIII represents the settlement area with the least buildings density. The anomalies which are represented here it is possible, to explain as the remains of several large buildings which are perhaps intended for military garrison. On the other hand, it is the highest part of the settlement, and it probably undergone the strongest destructions during the Second World War. For this speaks extensive areas of the positive anomalies, connected probably with traces of burning.

The excavation which was carried out in the V zone, showed quite difficult structure of the cultural deposits. Initially the surface of the rock was rough here and, apparently, had deep hollows. The leveling works, which are carried out before construction, led to emergence powerful (to 0,5 m) leveling layer, upon which actually and are based both the foundations of early constructions and the main street, which at the initial stage didn't had the shell bedding. Further, after destructions of the second half of the III century AD, leveling works were carried out on this place again, and the street received a new covering. At the final stage all this site was overlapped with very dense layer of loam with a big share of the content of ashes. The remains of any constructions connected with this layer are absent. It should be noted, that the places of ashen soil, coming up to the level of a modern day surface, are revealed in many parts of the ancient settlement. There are many of such places also and in the center. Lifting material doesn't allow to answer unambiguously a question of time of their emergence, however hardly it occurred before the middle of the IV century AD. In any case, where their managed to be investigated archaeological, they obviously overlap the remains of constructions of the previous time. Perhaps, to these reasons, but not consequences of the Second World War, the areas of positive anomalies in the central part of the ancient settlement are explained. In the case, when the ashen layer is absent, results of magnetic survey reflect the remains of structures of earlier time, which are quite, correspond to the structures, revealed during archeological excavations, taking, of course, into account imposing of reconstructions at different times.

The similar picture is observed and in a zone II, which corresponds to a northern site of the ancient settlement (figure 3). However, in this case it is possible to be guided only by data of the archeological excavations, which were carried out before 2007. In a zone II are located, apparently, the ruins of the village Adzhiel, adjoining to the ancient settlement from the northwest, that marked on cards of the end of the XIX century. The numerous iron objects, containing in soil, exclude the possibility of recognition of any ancient objects by means of magnetic survey.

Here is not revealed the traces of any leveling works at the initial stage of construction. Perhaps, the site was a little leveled and strengthened on a slope from outer side of the base of a defensive wall. More essential changes happened after rout of the second half of the III century AD. At preservation of the general configuration of constructions and even their some expansion and complication, the level of a day surface was considerably raised. As a result the early premises received the second level of a floor (over a fire layer), or passed into the category basements and semibasements. At the final stage the areas of buildings are reduced, and the territory which is directly adjoining a defensive wall, as well as the remains of the foundation of the last, are filled a powerful layer of ashes with the remains of household garbage. This ashen sandy loam also created peculiar “wall” on the northwest edge of the hill.

The zone I, which corresponds to east part of the ancient settlement (figure 3), apparently, was a zone of a housing estate. Anomalies of a magnetic field have space-uniform character here. It is possible to allocate some blocks of the negative anomalies, corresponding probably to the remains of the buildings, divided by linear positive anomalies which can be connected with the streets, covered with a layer of ashen soil. Two areas, allocated with ovals, are free from regular building and, perhaps, are the “squares”, on bigger from which, there can be some building of public appointment. Perhaps, also, that in its northeast part there was a production connected with fire. This is supported by the presence here of a large in area and value positive anomaly. The position of the defensive wall, presumably, indicated by a slight negative anomalies. Possibly, the wall is strongly destroyed, or disassembled. The area of “inhabited” buildings in a zone I within a city wall is about 0,9 hectares, the total area of a zone about 1,5 hectares. Housing estate consists of 40-60 houses-rooms, of 80-120 sq.m. each, including, perhaps, internal court yard. The total area of these houses is about 0,45 hectares. The same territory is occupied by streets. The houses can have internal division, which is not reflected in the interpretation plan.

Archaeological excavations in this area were carried out in the eastern corner of the site. The layer of antique period, located here directly on bedrock, overlapped by layer of saltovsky time. With the layer of saltovsky time associated the remains of some fences, residential buildings (figure 11) and a part of the ash hill with throats of pits, marked with stone facing (figure 12). This picture is very weakly consistent with the interpretation of magnetic data survey in zone I, however, quite corresponds to the picture received on the IV zone, adjoining an excavation from the West. Most likely, the fact, that the constructions zone IV belong to a very different period and are connected with a completely different ethnic group, explains the apparent contrast of this area from other areas of development.



Figure 11. The remains of constructions of saltovsky time in east part of the settlement.



**Figure 12. The ash hill of saltovsky time in east part of the ancient settlement.**

Concerning buildings in zones VI and VII (their selection in the individual zones is not so much the typological as geographical, to highlight the western and southern corners of the defense system of the settlement), it can be noted that the density of development is quite high and has irregular character (figure 3). Probably, there were some structures connected with defense system in this part of the settlement, which was less protected with natural borders, than east part. Complexes of anomalies 4 and 5 (figure 3) may represent the remains of large buildings destined for a military garrison.

Interpretation of the magnetic survey is confirmed by results of archeological excavations, however evolution of a natural landscape under the influence of anthropogenic factors in the West and the South was not identical.



**Figure 13. The leveling layer under the foundations of the defensive wall in the southern part of the settlement.**

Formation of the modern image of the western section flowing through the scenario, similar to the situation in the North. At the initial stage, during the construction of the corner towers and the adjoining curtains, preliminary works were limited to the strengthening of the slope on the outside fortifications. The foundations of all the buildings of this time are buried directly in the mainland. At the end of III – the beginning of the IV centuries AD corner tower was reinforced with a powerful anticollision belt with filling the space between the foundation of the tower and the outer face of masonry belt with quarystone. In the second half of the IV century AD the remains of all constructions on this place were filled up with a layer of ashen sandy loam, formed the image of this area, which remained up to the beginning here of archeological excavations.

In the South, the situation is different. Here the terrain was lower and differed in bigger roughness , therefore leveling works were required at the initial stage of construction. Leveling layer is present over the entire area of the excavation. On this layer were built on the defensive walls (figure 13). Subsequently, similar work carried out on the site at least twice: at the end of III – the beginning of the IV centuries AD during the construction of a new defensive wall and later, when the wall has ceased to function. In the saltovsky period this place was used for some economic needs. In any case, the latest constructions here representing the remains of some fences can be referred to this time.

On the basis of the results of the magnetic survey interpretation of buildings structure, we can estimate the population of the monument, who lived in residential areas in zones I and IV. Total area of residential development within the city walls in these areas is about 1.8 hectares. Probably, here lived the civilian population of the ancient settlement. The total area of houses is about 0,8 hectares. Within this residential zone, if to accept S.D. Kryzhitsky's estimates (Kryzhitsky, 1982) for other Bospor fortress - Ilurat (accommodation of 7-8 people in the module of 100 sq.m.) could live 500-700 persons. Close number (about 700 people) gives the estimation of population by M.N. Hansen method (Hansen, 2006; Smekalov, 2009), however, this estimate applies not to the total population of the settlement, but only to the civil part of it.

### CONCLUSION

In general, as showed the analysis of archaeological material in combination with data of the magnetic survey, the modern look of the hill, on which the ancient settlement of "Belinskoye" is located, was formed under the influence of anthropogenic factors throughout a long time, since the moment appearance here the person in the period of late bronze and before the early Middle Ages. In later time anthropogenic influence generally carried destructive, but not creative character. However the biggest transformations fall on the II-V centuries AD. Then all territory of the hill underwent changes, and cultural deposits of this time are the most powerful on the settlement. In the future, it is interesting to conduct a similar analysis of the changes in the landscape for other major ancient settlements located in the Eastern Crimea - Artesian, Bagerovo North, Sauromates and others.

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