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Land Use and Land Management in a Gardening Non-Commercial Partnership

Alexander A. Sidorov[1][a], Darya I. Vasilieva[2][b], Olga N. Soboleva[3][c], Yuri A. Kholopov[4][d] and Nadezhda Y. Michurina[5][e]

[1]*Samara State University of Economics, 141, Sovetskoi Armii st., Samara, Russia*
[2]*Samara State Technical University, 244, Molodogvardeyskaya st., Samara, Russia*
[3]*Rostov State Transport University, 2, Rostovskogo Strelkovogo Polka Narodnogo Opolcheniya sq., Rostov-on-Don, Russia*
[4]*Volga State Transport University, 2V, Svobody, Samara, Russia*
[5]*Yugra State University, Higher Ecological School, 16, Chehova, Khanty-Mansiysk, Russia*
sidorov120559@yandex.ru, vasilievadi@mail.ru, sobolevao@yandex.ru, lto@mail.ru, nmichurina@mail.ru

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Abstract: Garden non-commercial partnerships are a common form of association of people for land cultivation, recreation, leisure and social interactions, the problems of their use remain unresolved. Location, features of land use and land management of territories allow to determine publicly available state and corporate digital geoinformation resources and systems. SNT “Rakitovka” in Samara is characterized by favorable conditions for gardening, developed infrastructure and convenient location. Being located on the lands of settlements, there are no negative processes and disturbed lands, lands for construction and land plots are free from the rights of third parties. Directly on the land mass SNT zones with special conditions of use of the territory are not established, except that all of it is included in the protection zone of transportation. The land plots are located in five cadastral quarters, significantly differing in their information, and in the vast majority of them there is a lack of complete documentary grounds for the boundaries of real estate objects. The SNT shows clarifying cadastral works, discusses the procedure of their realization on a specific land plot using modern solutions and technologies.

1 INTRODUCTION

Community gardens in developing and in developed countries are considered key topics in terms of food production and food security as well as social inclusion and participation (Codato, Grego, Peroni, 2024; Jensen, Sørensen, 2020). They are areas in urban areas with public or private land ownership, and the members of these communities form a distinct branch of urban agriculture (Ponstingel, 2022). In the context of historical, socio-economic and legal conditions, a rich diversity of urban garden plots has developed worldwide (Poniży, Latkowska, Breuste, Hursthouse, Joimel, Külvik, Leitão, Mizgajski, Voigt, Kacprzak, et al, 2021; Park, Jeong, 2020). However, they face great challenges in their development in urban environments (Kwartnik-Pruc, Droj 2023). In land use and land management of community gardens for rational management, mapping and the use of geographic information systems are becoming more and more widespread (Delgado, 2017).

Garden non-commercial partnership (SNT) in Russia is a common form of association of people for cultivation of land and crop production (gardening and horticulture), recreation, leisure, social

[a] https://orcid.org/0000-0003-0122-7752
[b] https://orcid.org/0000-0002-0808-8364
[c] https://orcid.org/0000-0002-4482-2714
[d] https://orcid.org/0000-0002-2442-7186
[e] https://orcid.org/0009-0006-0527-4571

interactions in common interests (Koryagina, Porshakova, 2024; Russian Federation, 2017). In the Samara region there are 1075 registered SNTs on an area of 30 thousand hectares, and the users are more than 1.5 million residents of the region, which is almost half of the population of the province (Rosreestr, 2020). The largest area of SNTs in the region is concentrated inside its capital and along its borders - western, south-western, southern, south-eastern and northern parts. They form a semicircle with a significant enclosure in the territory of the suburban municipal district of Volzhsky and beyond (Krasnoyarsk, Kinelsky districts), which is supplemented by local formations along transport highways, near settlements far outside the urban environment.

The peculiarities of garden and vegetable garden land plots include the possibility of their formation from the lands of settlements or agricultural lands, and their use is associated exclusively for their own needs, with the intended purpose and in accordance with the permitted use (Rosreestr, 2020).

The full list of types of permitted use is contained in the Classifier approved by the Rosreestr Order No. P/0412 of 10.11.2020 (Fedoskin,2023). According to this document, the lands of SNTs can have three types of permitted use.

Under code 13.0 - land plots that are property of common use and are intended for common use by rightholders of land plots located within the boundaries of the territory of citizens' gardening or horticulture for their own needs, and (or) for placement of capital construction objects related to property of common use. Specific objects are roads, passageways, passages, playgrounds, areas of collective recreation and general meetings, sanitary protection zones, water bodies, etc.

Under code 13.1 (vegetable gardening) - recreation and (or) cultivation of agricultural crops by citizens for their own needs; placement of outbuildings, which are not real estate objects, intended for storage of inventory and crops.

Under code 13.2 (gardening) - recreation and (or) cultivation of agricultural crops by citizens for their own needs; placement of outbuildings and garages for their own needs. It is also provided for the right to place a residential house, which is a free-standing building with a number of above-ground floors not more than three, height not more than twenty meters. The building must consist of rooms and premises of auxiliary use intended for satisfying by citizens of household and other needs associated with their residence in such a building, not intended for division into independent real estate objects.

At the same time, researchers note a significant list of problems related to the lands of SNT. The issues of responsibility for violation of the regime of dacha and garden land plots are covered (Baidin, 2023). Land risks in the life of gardening associations are discussed (Komissarova, 2023). Solutions to problematic issues of authorized land use for SNTs are outlined (Sidorov, Voronchenko, 2020). A significant number of errors related to incorrect indication of land plot boundaries, their intersection with other plots or discrepancy between cartographic data and real location, etc. are noted (Yandex, 2025). In general, in recent years it is possible to note great transformations in land use and land management of SNT territories, creating difficulties in the implementation of accounting and management of land resources. And the relevance of the selected topic is due to the need to assess the land use and land management features in SNTs.

The object under study is the territory of SNT “Rakitovka”, located in the north-eastern part of Samara urban district on the border of Kirovsky and Krasnoglinsky intra-urban district. Land plots by type of permitted use are registered according to the documents as for gardening.

The study is based on the following methods: comparative-geographical, cartographic, forecast-analytical, geodetic, expert assessment, monographic description of the state and use of the territory of SNT “Rakitovka” as one of the examples of gardening and dacha associations. For this purpose the authors used digital geoinformation resources and systems of federal, regional and local levels, state and corporate, open electronic sources of the Internet, primary materials of geodetic and cadastral service, results of practical land surveying and cadastral activity, literary sources. Subsequently, the obtained materials were brought together into a unified information and analytical base for systematization and assessment.

2 PURPOSE, OBJECTS, METHODS AND MATERIALS OF RESEARCH

The object under study is the territory of SNT “Rakitovka”, located in the north-eastern part of Samara urban district on the border of Kirovsky and Krasnoglinsky intra-urban district. Land plots by type of permitted use are registered according to the documents as for gardening.

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The article aims to analyze problematic land use issues and land management process peculiarities on the garden non-commercial partnership territory in modern conditions.

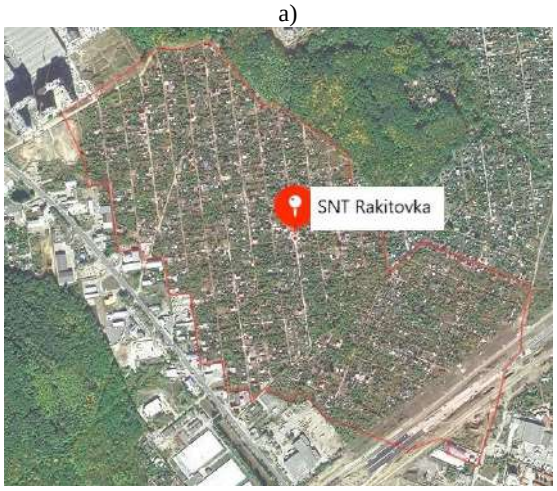
3 STUDY RESUL

The location of SNT "Rakitovka" is extremely favorable in terms of accessibility to the city highways of Samara and fast enough movement outside the city. These conditions are provided by Rakitovskoe highway, directly adjacent to the land massif from the west - south-west, Olimpiyskaya street from the east and the under construction highway "Tsentralnaya" from the south, as well as close to Karl Marx Avenue and Moskovskoe highway (Fig. 1). This advantage of location is obviously of interest not only to garden owners, but also to developers, judging by the gradual development of adjacent territories by construction of residential and public complexes.

Modern digital geoinformation tools allow to use the "ruler" and "area" options to determine geographical parameters. Using Yandex.Maps modes we determined that the land massif has an elongated shape from north-west to south-east at the extreme points with a width of about 0.73 km and a length of 1.4 km, borders with a length of 4.5 km and a territory area of about 0.9 km^2.

On the presented map in the "scheme" layer of Yandex.Map, the most convenient form of arranging the blocks in garden areas in the form of elongated rectangles with different aspect ratios and with simple names of streets and alleys numbered with Arabic numerals (1st, 2nd, 3rd, etc.) is clearly visible.

a)



b)

Figure 1: Location of SNT "Rakitovka" from Yandex. Maps: a) Map Layer; b) Satellite Layer.

The territory of the SNT is framed by forests. From the north and northeast of the 17th quarter of Prigorodny Forestry, on part of the land, which is being built residential complex Kislorod. From the south-west behind the Rakitovskoye highway is located forest massif Nagornaya Dacha. Around the SNT developed economic activity: along the entire Rakitovskoye highway are numerous capital structures: gas stations, administrative buildings, car services, car wash, garages, commercial pavilions, stores, parking lots, warehouses, etc. On the north-western side, multi-storey residential buildings are being constructed (Residential Complex Moskovskiy). As follows from the cartographic materials, no permanent watercourses were found in this area.

The terrain is relatively flat. On the electronic topographic map you can use the color scale of terrain elevations for preliminary assessment. To accurately

determine the horizontal mark of a particular place it is enough to use the mouse cursor, and when you press its left button the corresponding figure in meters appears (Fig.2).

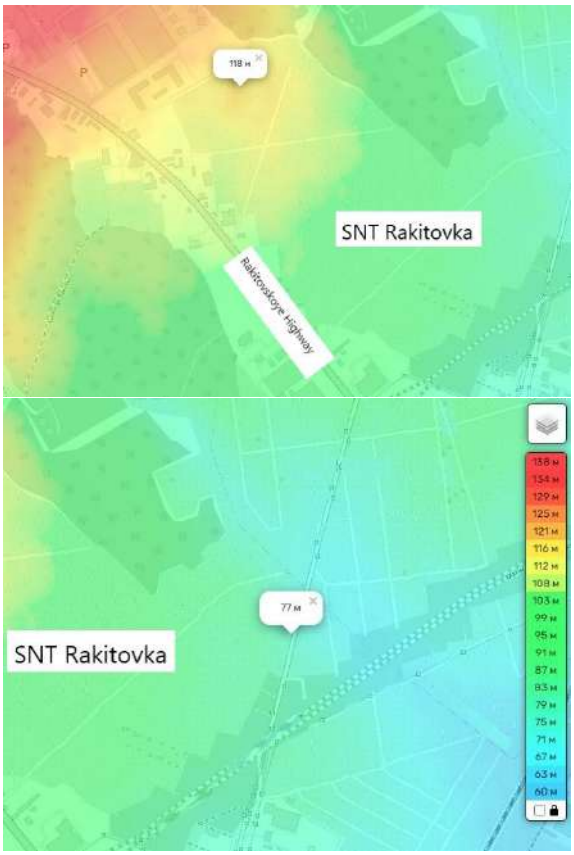


Figure 2: Horizontal surface elevations of the land massif SNT "Rakitovka" on the electronic topographic map from Free topographic map.

As a result of simple manipulations we obtained that the highest marks show 118 meters above sea level in the northern part of the SNT. Then the surface elevation gradually decreases, approximately to the middle of the massif, to 110 meters. This is followed by a further more intense decrease towards the east to a minimum value of 77 meters. Thus, the height difference from the maximum to the minimum elevation is 41 m. Taking into account the distance indicator (the length of the SNT territory is 1400 m) and the exceedance (41 m), the slope will be 2.93% (29.28 ppm or 1.68 degrees).

According to the classification of land surface slopes for flat countries, the obtained result characterizes the territory of SNT as slightly sloping plains or very gentle slopes of southeastern exposure (Osipov, 2016). They are very convenient for the cultivation of gardens and horticulture, construction of houses and outbuildings.

To further analyze the features of land use and land management of the territory of SNT, let us turn to the Federal State Information System "Unified Digital Platform 'National Spatial Data System' (FGIS UDSP NSPD). This is a domestic geoinformation software, created to work with spatial data from federal and regional information systems, coming to the platform within the framework of information interaction. Within the framework of FGIS UDC NRSD there is a subsystem of the real estate market (ensuring the state cadastral valuation of real estate).

Geoinformation Portal "Public cadastral map" in the complex of FGIS UDC NSPD demonstrates 12 subsystems, It provides a significant list of information about land plots, real estate objects and conditions of their use in the form of a number of cartographic layers. Thus, using the subsystem "Land plots" we find the layer "Land plots from the Unified State Real Estate Register", where we see that the main land mass of the SNT "Rakitovka" is located on the lands of settlements (Fig. 3).

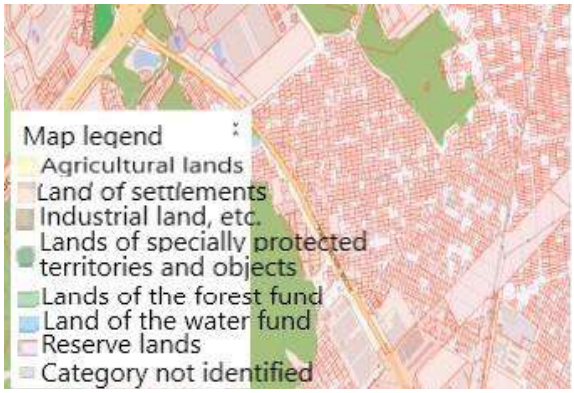


Figure 3: Categories of land in SNT "Rakitovka" and registration of land plots in the USRN.

In the southern and south-eastern part of the SNT a significant part of land plots were located on reserve lands, which is considered a violation of modern legislation on the use of this category of land. These lands are currently withdrawn from the territory of Rakitovka SNT and are being actively transformed for the construction of the Tsentralnaya highway. The forest area located in the north belongs to the lands of Samarskoye Lesnichestvo. In the submitted layer of the Portal it can also be seen that the main part of the land plots is on the state registration, as evidenced by the red-colored lines along the boundaries of the plots.

Further analysis of the materials of the federal portal showed that the territory of the SNT does not pass the boundaries of settlements, there are no negative processes and disturbed lands, land for construction and land plots are free from the rights of third parties. There are no zones with special conditions of use of the territory, such as zones of protection of cultural heritage objects, natural areas, protected objects and security and others, except that it is included in the transportation protection zone..

The land plots in the SNT are mostly rectangular in shape, but you can also see triangular shape, trapezoidal and polygonal shape, with an average of about 600 square meters each.

The materials of the Portal allow to assess the accounting or cadastral information on land plots of SNT "Rakitovka" (Fig.4).

Figure 4: Cadastral quarters on the lands of SNT "Rakitovka".

Land plots of SNT "Rakitovka" are located in five consecutive cadastral quarters from 63:01:0257001 to 63:01:0257005, significantly differing in cadastral data.

The analysis of title documents has shown that land plots in cadastral quarters 63:01:0257001 and 63:01:0257002 back in the Soviet era were mainly given to employees of Kuibyshev Automobile Tractor Electrical Equipment and Carburetors Plant (KATEK). Plots for gardening in cadastral quarters 63:01:0257003 and 63:01:0257005 were assigned to employees of Kuibyshev Metallurgical Plant. And land plots in cadastral quarter 63:01:0257004 were assigned to employees of clinics of Kuibyshev Medical Institute.

It should be noted that the number of land plots and located buildings with and without certain boundaries differs in cadastral quarters. So, at present, in cadastral quarter 63:01:0257001 the number of land plots with boundaries is 235 pcs, and 46 land plots do not have them (see Fig. 3). In cadastral quarter 63:01:0257005 there are 203 plots with boundaries, and 70 land plots have no boundaries. At the same time, according to open available documents, the land plots of SNT "Rakitovka", in the vast majority, has the status of previously registered land plots.

The number of buildings registered in the USRN, on the land plots of SNT "Rakitovka", for example, in the cadastral quarter 63:01:0257001 is only 41 pcs, and in the cadastral quarter 63:01:0257005, even less - 32 pcs (Fig.5).

Figure 5: Placement of buildings registered in the USRN, on the land plots of the Rakitovka SNT.

Therefore, in all cadastral quarters of SNT "Rakitovka" there is a significant lack of complete documentary grounds for the real estate boundaries (information on geodetic coordinates), which imposes certain restrictions in their use.

4 DISCUSSION

Obviously, the territories of SNTs are not a priority for the vital activity of the population, so cadastral registration is not as active here as, for example, in a populated area in residential zones. According to the land legislation, if in the cadastral passport or extract for the land plot there are records that the boundary of the land plot is not established, then at the initiative of the interested party can be carried out in the established order cadastral registration of changes or clarifications in the specified information. In order to avoid further problems with accounting and use of land plots, it is necessary to carry out clarifying cadastral works in order to correct the available data to authentic ones.

To realize the possibilities of specifying real estate objects in the SNT "Rakitovka" you can follow the following procedure of cadastral works carried out on the land plot in this association of amateur gardeners on the street 10, plot No. 44. This is quite relevant in view of the fact that developers are showing increased interest in this land massif.

Cadastral works on a land plot should be performed in accordance with modern regulatory and legal requirements and technical support. In this regard, it is advisable to first define the stages of designing and performing cadastral works:

- collection by a specialist (cadastral engineer) of up-to-date information about the land plot from the cadastral service (Rosreestr), necessary documents from archival services (extract from the USRN) on the main characteristics and registered rights to the real estate object; cadastral plan of the land plot territory for the cadastral quarter within which the land plot of works is located; extract from the catalog of geodetic points; archival cartographic materials of the USRN;
- Field works - survey, measurement, measuring works, geodetic survey of characteristic points of the site boundary;
- cameral work on forming a package of documents (boundary plan) for the land plot for entering information about it into the Unified State Register of Registers of Land Plots.

The customer has provided the following as documentary support:

– cadastral site plan;
– registration certificates;
– land use plan;
– sales agreement;
– statutory inheritance certificate;
– consent to personal data processing.

The key importance in this case is geodetic work, which needs to be properly planned and carried out. To carry out geodetic work you will need:

- situational plan of the land plot location on the ground;
- similar geodetic points from the extract of the official catalog of geodetic points in the Samara region.

The necessary work can be done with satellite geodetic equipment and a satellite geodetic multi-frequency receiver. For this purpose, reconnaissance of the terrain and starting points is performed. A trip is made to the area where the land plot (work site) is located for its survey and search for the starting points (in what condition they are). As well as selection of coordinates and method of work execution.

The reconnaissance revealed that the starting points were found and are in satisfactory condition and suitable for work; the work site is in open terrain (Fig.6).

On this basis, to determine the characteristic points we chose the method of satellite geodetic measurements using satellite equipment from the points of the boundary survey network.

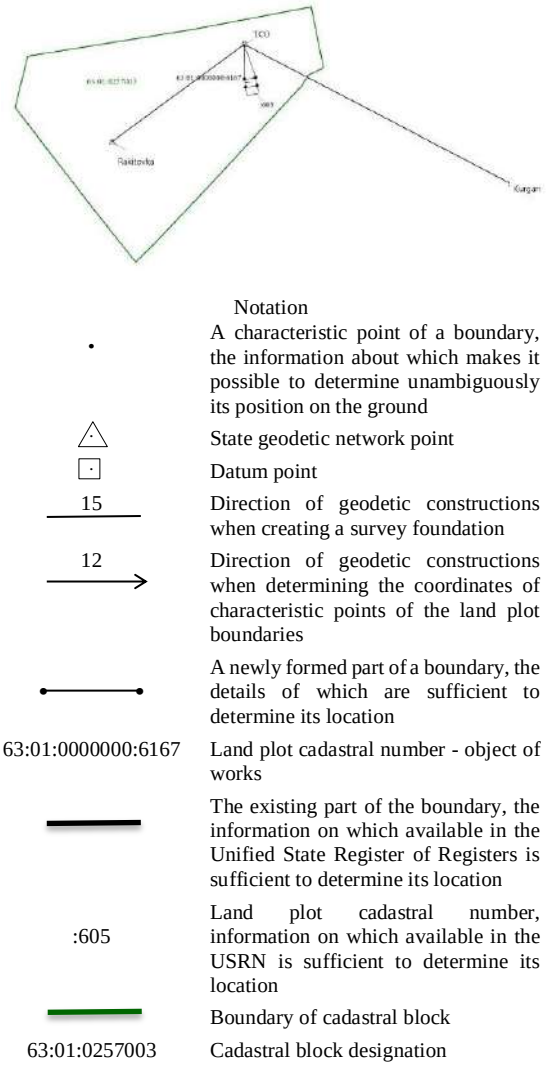


Figure 6: Location scheme of initial geodetic points for determining characteristic points of land plot boundaries from Federal portal of spatial data.

For field work we used satellite geodetic equipment of Topcon Positioning Systems company - multi-frequency GNSS receivers. First of all, GRS-1 is a receiver with the ability to work universally in high-precision positioning, both in the foreign GPS system and in the domestic Glonass system. And also GR-3 with FC-250 controller. To do this, at one of the source points set the base station GR-3, and the second receiver GRS-1 moved on the determined points. Determination of the coordinates of the characteristic points were carried out in the "walking-staying" mode. According to some estimates, this mode "is ideal for small areas where the observation

points are located near each other and where there are no obstacles to the passage of radio signals from satellites" (Sitdikov, 2022).

In this case, the FC-250 controller was used, which allowed switching between the modes "walking" and "standing" and carrying out direct control of geodetic surveying. For control, the coordinates of the second source point were determined and compared with the coordinates from the extract of the catalog of geodetic points of the Samara region, which was ordered to work with the studied land plot. The accuracy of coordinates determination was in accordance with the order of Rosreestr from 23.10.2020 № P03/93 (amended on 29.10.2021) "On approval of requirements to the accuracy and methods of determining the coordinates of characteristic points of land plot boundaries, requirements to the accuracy and methods of determining the coordinates of characteristic points of the contour of a building, structure or construction in progress on a land plot, as well as requirements to the determination of the area of a building, structure or premises". The error in the measurements made in this case was not more than 0.10 m. A horizontal survey log was kept in the field to record the results of measuring side lengths and turning angles. In addition, it depicted an outline in the form of a hand-drawn schematic drawing of the working version of the land plot for the subsequent development of a topographic plan. Immediately after the completion of the field survey, the act of establishing and fixing the boundaries of the land plot was agreed and signed with the land user.

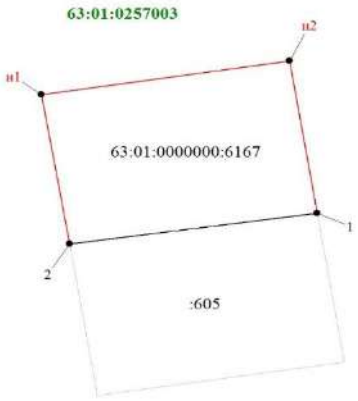
After the field work is done, the next stage is the cameral work, which is carried out, as a rule, with the help of a number of software products and the required equipment of modern GIS (Sidorov, Savinkova, 2022).

The desk work included:

- Transfer of field information from satellite receivers into computer programs;
- processing of field measurements in the "Topcon Tools" program, integrated with all Topcon equipment, built on a modular principle, simplifying basic operations and allowing, among other things, to equalize observations;
- drawing up a land plot plan using an outline from the field journal in the ARGO 7 software package;
- boundary plan production.

The boundary plan was prepared in the domestic software package "ARGO 7", represented by the main programs: Argo Accounting and Argo Drawing and integrated into the Public Cadastral Map. This software product is designed for preparation of boundary plans of land plots in accordance with the requirements of the Order of Rosreestr from 14.12.2021 № P/0592 "On approval of the form and composition of information of the boundary plan, requirements for its preparation". As you know, a boundary plan includes text and graphic parts.

The graphic part of the boundary plan shall obligatory include a scheme of geodetic constructions, a scheme of location of the land plot relative to the cadastral quarter, as well as a drawing of land plots and their parts (Fig.7).



Scale 1:500

Notation	
•	A characteristic point of a boundary, the information about which makes it possible to determine unambiguously its position on the ground
	A newly formed part of a boundary, the information on which is sufficient to determine its location
	The existing part of the boundary, the information on which available in the Unified State Register of Registers is sufficient to determine its location
:6167	Inscriptions of the cadastral number of the land plot
	Boundary of cadastral block
63:01:0257003	Designation of cadastral block

Figure 7: Drawing of land plots and their parts.

The drawing shows the contour of the plot and numbering of points, coordinates of which are specified in the text part of the document. Part of the contour is shown in black color, as it belongs to the previously registered neighboring plot, which became the basis for cadastral works. The most part of the contour is shown by lines of red color, as they are formed from new characteristic points, determined as a result of geodetic works and accordingly marked on the drawing with the prefix "n". Also on the scheme,

in addition to the boundaries of the site is indicated the number of the cadastral quarter (in green), the contours of the previously established site (in gray) with the end of the cadastral number ":605" and the cadastral number of the surveyed site itself. A fully formed boundary plan is intended for subsequent registration actions.

Thus, the analysis of land use and land management on the territory of SNT "Rakitovka" and conducted field and desk work on a particular land plot, related to the clarification of its boundaries, indicate the problematic issues on this land mass and ways to solve them.

5 CONCLUSION

Community gardens, garden non-profit associations, where land use and land management remain unresolved, are a common form of association of people around the world for cultivation, recreation, leisure and social interactions.

Publicly available state and corporate geoinformation systems, resources and documentation are used to describe location, define land use and land management features. Special importance is given to the Federal State Information System "Unified Digital Platform "National Spatial Data System".

The territory of SNT "Rakitovka" in Samara is characterized by favorable conditions for gardening, developed infrastructure and convenient location. It is located on the lands of settlements and on its territory there are no borders of settlements, there are no negative processes and disturbed lands, lands for construction and land plots are free from the rights of third parties. There are no zones with special conditions of use of the territory directly on the land mass of the SNT, except that the whole of it is included in the transportation protection zone.

Land plots are located in five cadastral quarters, which differ significantly in cadastral information, and in the vast majority of them there is a lack of complete documentary grounds for the boundaries of real estate objects.

Recommended clarifying cadastral works, discussed the procedure of their implementation on a specific land plot of SNT with the use of modern technologies and solutions. The field and cameral stage in the full cycle of cadastral works was carried out and a boundary plan for registration actions was drawn up.

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