

ASPECTS OF LAND MANAGEMENT AREAS OF SOLID WASTE LANDFILLS

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Solid waste landfills are harmful to the ecological state of the environment. Settlements of the Russian Federation are faced not only with the problem of solid waste disposal, but with the necessity to prevent environmental disasters due to the operation of landfills. The article deals with the impact of solid waste landfills on the pollution of land, air, surface and groundwater. Examples of migration of harmful substances, secondary pollution are given. For the population living near the landfill it is proposed to use the term "involuntary residence". A thematic map of the location of solid waste landfills in the city of Novosibirsk has been compiled. There made the conclusions about the loss of consumer properties of real estate near solid waste landfills which reduces the market value and investment attractiveness of real estate. To minimize the negative impact of solid waste landfills, an improved method of rational land use of landfills is proposed. The methodology includes geodetic works, engineering and cadastral monitoring using geodetic instruments, as well as unmanned aerial systems. Examples of foreign countries on construction of plants for processing of garbage are considered. The conclusion is made about the economic feasibility of complete waste disposal. The long-term positive effect of the operation of the land and property complex located in the geospatial object of waste processing is predicted.

Key words: solid waste, cadastral value, land plots, land protection, rational land use, forced residence, geospatial landfill, land monitoring system, waste processing.

REFERENCE

1. Vaysmana, Ya. I. (2012). *Upravlenie otkhodami. Stokhnye vody i biogaz poligonov zakhroneniya tverdykh bytovykh otkhodov [Waste management. Waste water and biogas landfill of solid waste]*. Perm': Perm National Research Polytechnic University Publ., 258 p. [in Russian].
2. Grekova, A. O., Dubrovskiy, A. V., Poshivaylo, Ya. G., & Ustavich, G. A. (2018). Suggestions for improving the system of protection and monitoring of lands of landfills. In *Sbornik materi-*

alov *Interekspos GEO-Sibir'-2018: Mezhdunarodnoy nauchnoy konferentsii: T. 2. Ekonomicheskoe razvitiye Sibiri i Dal'nego Vostoka. Ekonomika prirodnopol'zovaniya, zemleuстройство, lesouстройство, upravleniye i nedvizhimost'iu* [Proceedings of Interexpo GEO-Siberia-2018: International Scientific Conference: Vol. 2. Economic Development of Siberia and the Far East. Environmental Economics, Land Management, Forestry Management and Property Management] (pp. 107–112). Novosibirsk: SSUGT Publ. [in Russian].

3. Dubrovskiy, A. V., & Poshivaylo, A. O. (2016). To the question of the effects of pollution of urban land cadastral value of the property. In *Sbornik materialov Interekspos GEO-Sibir'-2016. Magisterskaya nauchnaya sessiya "Pervye shagi v nauke"* [Proceedings of Interexpo GEO-Siberia-2016. Master's Scientific Session "First Steps in Science"] (pp. 39–43). Novosibirsk: SSUGT Publ. [in Russian].

4. Ofrikhter, V. G. (2009). Peculiarities of classification of solid waste. *Vestnik Volgogradskogo gosudarstvennogo arkhitekturno-stroitel'nogo universiteta Seriya: Stroitel'stvo i arkhitektura* [Vestnik of Volgograd State University of Architecture and Construction. Series: Construction and Architecture], 14, 33–38 [in Russian].

5. Abramov, N. F. (2007). Sanitary cleaning of territories from household waste. *Tverdye bytovye otkhody* [Municipal Solid Waste], 7, 10–13 [in Russian].

6. Gorod v musore. In Novosibirsk the fight with natural landfills. (2018). *Ezhenedel'nik «Argumenty i Fakty»* [the Weekly "Arguments and Facts"], No. 49. Retrieved from: <http://www.nsk.aif.ru/gazeta/number/39277> [in Russian].

7. Akumov, A. I., & Mingazov, I. F. (1999). *Sostoyaniye okruzhayushchey sredy i zabolevayemost' naseleniya v Novosibirske* [The state of the environment and morbidity in Novosibirsk] (pp. 52–53). Novosibirsk: Nauka Publ., [in Russian].

8. Land code of the Russian Federation. Retrieved from ConsultantPlus online database [in Russian].

9. Federal Law No. 78–FZ of June 18, 2001. On land management. Retrieved from ConsultantPlus online database [in Russian].

10. Federal Law No. 7–FZ of January 10, 2002. On the protection of the environment. Retrieved from ConsultantPlus online database [in Russian].

11. Federal Law No. 89–FZ of June 24, 1998. On production and consumption waste. Retrieved from ConsultantPlus online database [in Russian].

12. Resolution of the government of the RF No. 681 of August 9, 2013. On the state environmental monitoring (state environmental monitoring) and the state data Fund of the state environmental monitoring (state environmental monitoring). Retrieved from ConsultantPlus online database [in Russian].

13. Instruction of the Ministry of construction RF. (1998). Instructions for the design, operation and reclamation of landfills for municipal solid waste. Moscow: Author.

14. Sanitar rules. (2001). Hygienic requirements for the device and content of landfills for solid waste (SP 2.1.7.1038-01). Retrieved from <https://base.garant.ru/12123803> [in Russian].

15. At the landfill "Sound" recorded another release of landfill gas. (n. d.). Retrieved from <https://www.rosbalt.ru/moscow/2018/03/29/1692405.html> [in Russian].

16. Potapov, A. D., Tupicina, O. V., Suhonosova, A. N., Saveliev, A. A., Grishin, B. M., & Chertes, K. L. (2014). Principles of guided recovery of the territories of waste placement. *Izvestiya vysshikh uchebnykh zavedeniy. Stroitel'stvo* [News of Higher Educational Institutions. Construction], 5, 98–108 [in Russian].

17. Skorik, Yu. I., Ventsyulis, L. S., Donchenko, V. K., & Onikov, V. V. (2007). Zoning of the territories of the Russian Federation taking into account the risk of environmental pollution by waste. *Nauchno-informatsionnyy byulleten' "Ekologicheskaya bezopasnost'"* [Scientific and Information Bulletin "Environmental safety"], 1, 42–48 [in Russian].

18. Ustavich, G. A., Dubrovskiy, A. V., Poshivaylo, Ya. G., Ahmetov, B. Zh., & Poshivajlo, A. O. (2016). Zoning and surveying of lands adjacent to nuclear test sites for the purposes of their economic use on the example of the Semipalatinsk nuclear test site). *Vestnik SGUGiT [Vestnik SSUGT]*, 4(36), 145–161 [in Russian].
19. Dubrovskiy, A. V., & Poshivaylo, A. O. (2016). To the question of the effects of pollution of urban land cadastral value of the property. In *Sbornik materialov Interekspo GEO-Sibir'-2016: Magisterskoy nauchnoy sessii «Pervye shagi v nauke» [Proceedings of Interexpo GEO-Siberia-2016: Master's Scientific Session "First Steps in Science"]* (pp. 39–43). Novosibirsk: SSUGT Publ. [in Russian].
20. Popp, E. A. (2014). Geoinformation analysis of the impact of the environmental component on the cadastral value of objects. In *Sbornik Materialov Mezhdunarodnoy konferencii: Innovatsii i GIS tekhnologii dlya razvitiya territoriy [Proceedings of the International Conference: Innovations and GIS Technologies for the Development of Territories]* (pp. 67–74). Ust'-Kamenogorsk: VKGTU Publ. [in Kazakhstani].
21. Ilyinykh, A. L., Klyushnichenko, V. N., & Mezhueva, T. V. (2018). To the question of methodological support of cadastral valuation of real estate. In *Sbornik materialov Natsional'noi nauchno-prakticheskoi konferentsii: T. 2. Regulirovanie zemel'no-imuschestvennykh otnosheniy v Rossii. Pravovoe i geoprostranstvennoe obespechenie, otsenka nedvizhimosti, ekologiya, tekhnologicheskie resheniya [Proceedings National Scientific Practical Conference 2018: Vol. 2. Regulation of Land and Property Relations in Russia: Legal and Geospatial Support, Real Estate Valuation, Ecology, Technological Solutions]* (pp. 214–223). Novosibirsk: SSUGT Publ. [in Russian].
22. Order of the Ministry of nature RF No. 525 of December 22, 1995. On approval of the Basic provisions on land reclamation, removal, preservation and rational use of the fertile soil layer. Retrieved from <http://base.garant.ru/2107557/> [in Russian].
23. Sheina, S. G., & Babenko, L. L. (2013). Selection of solid waste landfill site and factors taken into account in decision-making. *Internet-zhurnal Naukovedenie [Internet journal of Science]*, 5(18), 1–5 [in Russian].
24. Ilyinykh, A. L., Kiseleva, A. O., & Kolesnikov, A. A. (2015). Differentiated characteristics for calculating cadastral value of settlements lands by current Open Geodata. Information system for state cadastre of immovable property: development of cartographic database. In *Sbornik materialov Interekspo Geo-Sibir'-2015: Mezhdunarodnoy nauchnoy konferentsii: T. 3. Ekonomicheskoe razvitie Sibiri i Dal'nego Vostoka. Ekonomika prirodopol'zovaniya, zemleustroistvo, lesoustroistvo, upravlenie nedvizhimost'yu [Proceedings of Interexpo GEO-Siberia-2015: International Scientific Conference: Vol. 3. Economic Development of Siberia and the Far East. Environmental Economics, Land Management, Forestry Management and Property Management]* (pp. 121–126). Novosibirsk: SSUGT Publ. [in Russian].
25. Dubrovskij, A. V., Makht, V. A., & Kozochkina, E. A. (2017). Improvement of the methodical basis of cadastral valuation of residential property. *Vestnik SSGA [Vestnik SSGA]*, 22(4), 25–35 [in Russian].
26. Karpik, A. P., Osipov, A. G., & Murzintsev, P. P. (2010). *Upravlenie territoriei v geoinformatsionnom diskurse [Territory Management in geoinformation discourse]*. Novosibirsk: SSGA Publ., 280 p. [in Russian].
27. Sauts, A. V. (2012). Justification of sanitary protection zones of solid domestic and industrial waste landfills during their construction and operation. *Vestnik grazhdanskikh inzhenerov [Bulletin of Civil Engineers]*, 4(33), 199–201[in Russian].
28. Vereshchaka, T. V., & Kachaev, G. A. (2011). Topographic maps in the system ecodiagnostic areas: assessing anthropogenic effects. *Izvestiya vuzov. Geodeziya i aerofotos"emka [Izvestiya vuzov. Geodesy and Aerophotography]*, 3, 95–101 [in Russian].
29. Sharova, O. A., & Barmin, A. N. (2013). Environmental monitoring at solid domestic and industrial waste landfills. *Nauchnye vedomosti belgorodskogo gosudarstvennogo universiteta. Seri-*

ya: *estestvennye nauki* [Scientific sheets of Belgorod State University. Series: Natural Sciences], 3(146), 166–169 [in Russian].

30. Zharnikov, V. B. (2017) Rational land use and basic condition of its realization. *Vestnik SGUGiT* [Vestnik SSUGT], 22(3), 171–179 [in Russian].

31. Karpik, A. P., Dubrovskiy, A. V., & Kim, E. L. (2012). Analysis of natural and man-made features of the geospatial emergency. In *Sbornik materialov Interekspo GEO-Sibir'-2012: Mezhdunarodnoy nauchnoy konferentsii: T. 3. Geodeziya, geoinformatika, kartografiya, marksheyderiya* [Proceedings of Interexpo GEO-Siberia-2012: International Scientific Conference: Vol. 3. Geodesy, Geoinformatics, Cartography, Mine Surveying] (pp. 171–177). Novosibirsk: SGGGA Publ. [in Russian].

32. Sizov, A. P. (2000). *Monitoring gorodskikh zemel' s elementami ikh okhrany* [Monitoring of urban land with elements of their protection]. Moscow, 157 p. [in Russian].

33. Tugov, A. N., Moskvichev, V. F., & Fedorov, L. G. (2009). European experience in solving the problem of waste in megacities. *Tverdye bytovye otkhody* [Solid Domestic Waste], 7, 42–48 [in Russian].

34. Waste recycling plant in the centre of Vienna. *Livejournal* [Livejournal]. Retrieved from <https://storm100.livejournal.com/4824861.html> [in Russian].

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